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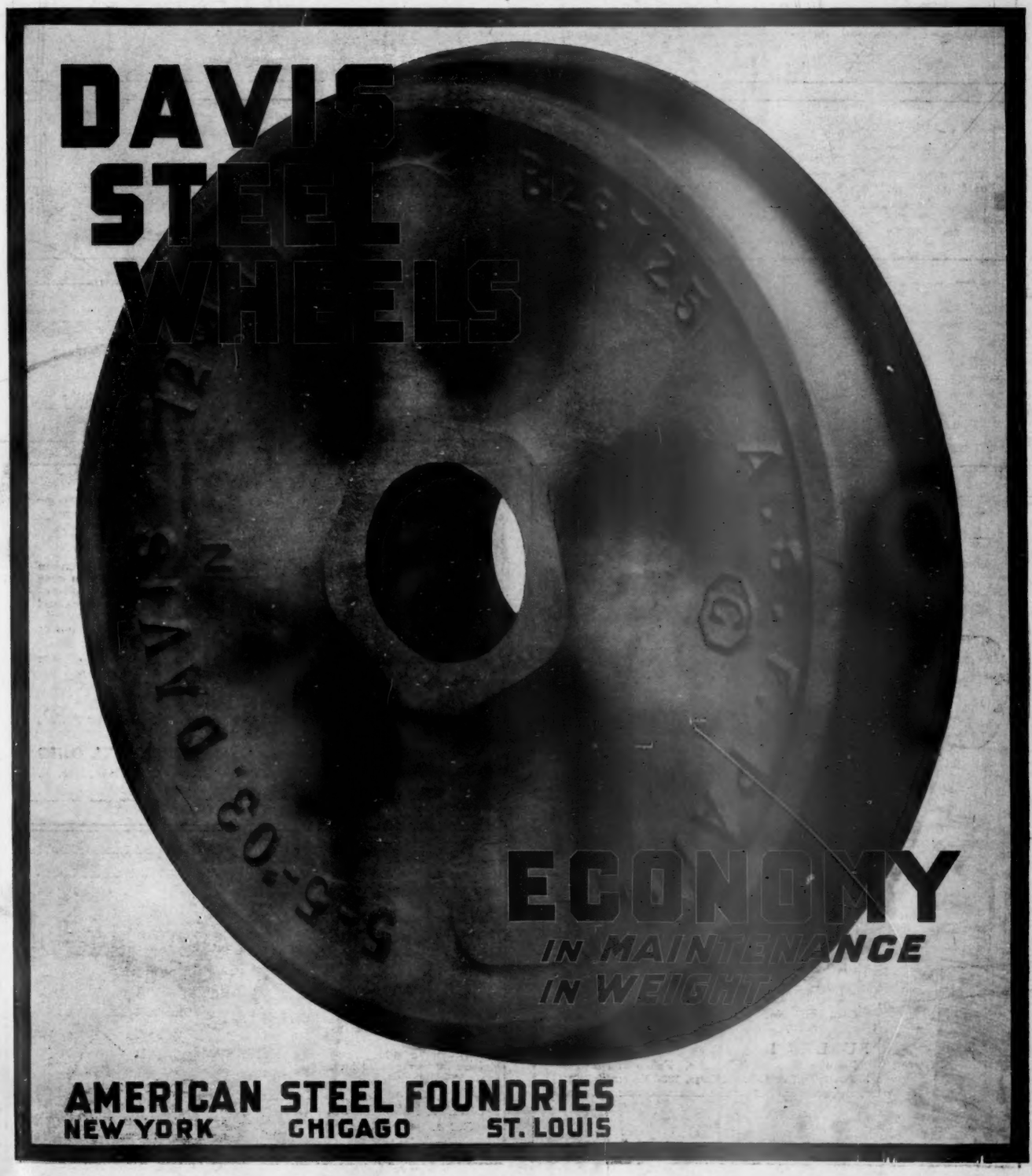
Railway Age

FIRST HALF OF 1918—No. 20 SIXTY-THIRD YEAR

NEW YORK: Woolworth Bldg.
CHICAGO: Transportation Bldg.

NEW YORK—MAY 17, 1918—CHICAGO

CLEVELAND: Citizens Bldg.
WASHINGTON: Home Life Bldg.



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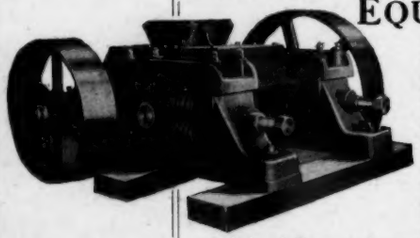
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EDITORIAL

Railway Age

Railroad men did their part splendidly in making the Third Liberty Loan a big success. Doubtless many of those who subscribed will have to suffer various inconveniences in order to meet the payments; your country needed your support in order to play its full part in the world war for democracy and you did your duty in backing it up. At the same time you made a safe and sound investment for yourself which will serve you well in the future. Next week is Red Cross Week and you will give fully—without thought of investment for self—to back up this magnificent organization in ministering not only to the wounded and dying on the battle field, but in relieving distress wherever it is found. An agency of mercy truly: also a great force for the upbuilding of the morale of our armies. Your support of the Liberty Loan and Red Cross is fine, but there is another big thing for you to do. Our boys on the other side are working under great hardships in spite of all we can do for them. Their souls are being tried to the limit and they are laying down their lives, or suffering injury with a smile on their faces. The successful outcome of the war depends on many things, but a vital link in the chain is transportation in this country. For humanity's sake be an optimist. Be an inspiration to those about you. Give of yourself as you have never given before. Don't slack on the job because you think, or know, you are not getting as much out of it as you should or as someone else is. We have all got to make sacrifices, if we are to win the fight. Can you afford to be a dollar chaser, or slacker, when your brothers are giving their very lives in the great cause? The call to military service, the draft and the competition of industries which are paying excessive wages and salaries have depleted the railroad ranks of skilled and experienced workers and executives. A great responsibility rests upon you.

Your Duty as an Individual

One of the most flagrant evils of unrestricted competition between railroads has been the building of duplicate lines where one could serve the territory adequately. This country has witnessed examples of this practice in practically every period of its railway development. Probably the most conspicuous examples of earlier days were the construction of the West Shore and the Nickel Plate roads parallel to what is now the New York Central. In more recent years the most active competition of this character has been in the northwest, where the struggle between the Hill and Harriman systems led to the construction of duplicate lines in several instances. The most notorious example was the building of the Oregon Trunk and the Des Chutes railways down opposite sides of the narrow canyon of the Des Chutes river for approximately 100 miles to reach a territory which, after several years, has not yielded enough traffic to justify even one line. With unified control of the roads the waste of funds for the construction of duplicate lines has been stopped. As an instance, arrangements are being completed whereby the Chicago, Milwaukee & St. Paul may be enabled to use a belt line of the Chicago & North Western northwest of Chicago and thereby avoid the construction of a parallel line which it had been contemplating for several years. Steps are also being taken to correlate existing facilities already built to afford greater economy and capacity without any sacrifice of service. The Wyoming Railway Commission has already asked that the Chicago & North Western line be abandoned between Shoshoni, Wyo., and Orin Junction, a distance of over 100 miles, and that the trains of this road be operated over the parallel line of the Burlington. A similar suggestion has been made relative to the two lines in the Des Chutes canyon, while the Western Pacific and the Southern Pacific are negotiating for the operation of their two single track lines as a double track road for a couple of hundred miles in Nevada. Railway men will agree that changes such as these are in the interest of efficiency and economy, regardless of whether the roads are operating under unified or individual control. For this reason the contracts now being made should extend for a sufficient number of years to insure the continuance of the plan after the roads have been returned to their owners.

The Elimination of Duplicate Lines

The Railroad Wage Commission touched in its report upon the salaries of railway officers. It says, "It is reasonably certain from the facts gathered by the commission that a substantial readjustment of such salaries can be made and the efficient operation of the properties thereby promoted. . . . Some salaries may well be abolished altogether, others greatly reduced, while in some cases of lesser paid officials an increase would be warranted." There can be no serious question that a large part of the lower paid officers of the railways, from division superintendents downward, are paid too little. In many cases conductors and locomotive engineers earn more than yardmasters, trainmasters, roadmasters, traveling engineers, master mechanics and division engineers; and in some cases they actually earn more than superintendents. Officials as well as employees who are receiving less than $250 a month will receive advances if the recommendations of the Wage Commission are adopted. Many division officials, however, should be given increases in excess of those recommended by the Wage Commission. It is anything but conducive to discipline and efficiency for officials to receive less pay than employees who are working under their direction. In practically every such case either the employee is being paid too much or the official too little. The statistics of the Interstate Commerce Commission show that in the year ended June 30, 1916, there were 14,401 general and divisional officers who received less than $3,000 a year, and that their average wage was only $1,664, or less than $140 a month. Many advances in salary have been made since then, but they have not been numerous enough or great enough; and a careful survey of the situation should be made by those in charge of railway management with a view of putting the salaries of the lower paid officials on a proper basis. What should be done about the salaries of the higher paid officials—say, from the general managers and their staffs upwards? Since the adoption of government control there has been much talk about the reduction of salaries, but nothing definite has been said officially as to whether any reductions are to be made, and

The Salaries of Railway Officers

if so where they are to begin and end, and how large they are going to be. The average salary of the 4,247 general officers receiving over $3,000 in 1916 was $6,462. This is not a "fancy" sum. It is modest, indeed, considering the responsibilities and duties of railway general officers. It includes, however, some very high salaries; and perhaps it was merely these that the wage commission referred to in saying that some salaries should be "greatly reduced."

The reduction of railway salaries has now been a subject of agitation for almost five months. If the Railroad Administration intends to do anything along this line more than it has done, the sooner it does it the better. Railway officers, like other human beings, are not able to work as efficiently when their minds are disturbed as when they are easy; and the man who can have an easy mind with a reduction of his income hanging over him which may affect his standard of living, has not been born, no matter how large his income is. Just how it can be thought that any considerable economy will be effected by a reduction of the salaries of the higher paid officers we do not understand. The total compensation paid to all railway officers receiving over $5,000 is $30,000,000 a year. That is about 1 per cent of operating expenses. The really high salaries probably do not constitute one-tenth of one per cent of operating expenses. The Railroad Administration needs the loyal and enthusiastic support of all the able men on the railways much more than it needs to secure the negligible saving that could be effected by reducing the salaries of these men or losing them from the service. Railway expenses are increasing fast already. The less first-class brains there are kept in the railroad business, and the less opportunity and incentive the first-class brains are given to work to their full capacity, the faster expenses will continue to increase.

Should Railroads Furnish Detailed Plans for Steel Bridges?

FEW RAILWAY NECESSITIES are purchased on so strictly a competitive basis as steel bridges. The patented device or design plays only a minor part in these structures, and variations in practice in the design or construction of different bridges arise rather through differences of opinion on the parts of railway bridge engineers than from an exploitation of particular proprietary features on the part of the individual bridge companies. Contracts for railway bridges are advertised, estimated and awarded on the basis of plans submitted by the railroad, there being exceptions to this only in the case of movable spans, where there may be a preliminary consideration of several patented designs.

Some variations as to this custom arise in the degree of detail shown on the plans supplied by the railroads. Some companies provide only a bare outline of the structure, together with specifications for the design, while others submit detailed shop drawings. The more common procedure is a mean between these two; in other words the preparation of general drawings showing the makeup of the members and limiting dimensions, while leaving the completion of the shop drawings to the bridge company.

The present tendency is almost entirely toward the preparation of at least the designing plans by the railroad, coupled with a thorough check of the shop drawings prepared by the bridge shop. The basis of payment in bridge contracts is now almost universally the pound price. The lump sum price with its various abuses is a matter of the past, but with inadequate engineering supervision, even the pound price has its disadvantages. The fabricator is naturally interested in selling as large a tonnage of structural steel as possible, and while the design under which he furnished the bridge may result in a most excellent structure, it may not be the most economical structure for the site. The submission of comparative designs considered clearly from the standpoint of the advantages to the railroad may easily result in a much cheaper structure which will fulfill all the requirements just as well. In view of these considerations there seems to be little question but that the railroad should supply the design, and where it has no staff competent to execute the work it should retain a consulting bridge engineer.

A more perplexing problem arises in connection with the preparation of the shop drawings. In most cases this work is left to the bridge company, but a few railroads have obtained no small degree of success in doing this work in their own drafting rooms. The real question as regards the preparation of the detailed plans is one of economy, including both the cost of preparing the drawings and the relative cost of the shop work as done from plans prepared under the two arrangements. The structural steel fabricators maintain that their own drawing rooms, through training, experience and close relation with the shop can prepare the detailed plans for less money, and that the finished drawings are better adapted to obtain shop economies than plans prepared in the railroad offices. In view of this, it is their contention that the price which they submit for a job for which they prepare the plans, will show a definite saving to the railroad company.

Without doubt the small railroad cannot economically maintain a force of detailers for the average run of work. On the other hand a few of the larger roads prepare detail drawings of all their bridge work. There are also special circumstances in which it has been found particularly advantageous for the railroad to prepare drawings in detail, for while the bridge company lays special emphasis on the close relation of its drawing rooms to the shop, it may ignore the relation of the drawing room to the field. Some structures involve such complications as to alinement, grades and clearances that the details can be worked out efficiently only by the man who has been in close touch with the project from the start.

Following this idea railroads have on occasion developed their own organizations and accomplished results that have been eminently satisfactory. Only recently a railroad in the middle-west built a complicated city viaduct structure and found that by following this practice it could not only prepare plans much faster with its own forces than could have been done by a bridge shop force unfamiliar with the job, but it also completed the plans at a very satisfactory cost per ton. As a further example, some years ago another railroad renewed a great many high timber trestles with steel viaducts. A large force of draftsmen was organized, standard designs and details were prepared which were applied to the various structures and although the work was subdivided among a number of fabricating shops the designs were uniform throughout, since they were all prepared by one group of men rather than by the widely separated drafting rooms of the several bridge companies.

Success of this kind depends as much on the service of skilled structural detailers as on the character of the supervision, and owing to the well known transitory nature of this work it has been possible during normal times to secure an adequate number of men with a thorough knowledge of bridge shop practice. It must be borne in mind, however, that structural detailing is virtualiy a trade, and while it is best done by men who follow this work as a vocation, such men cannot as a rule be used efficiently on other classes of drawing room work. There is therefore no economy in maintaining a force of steel detailers unless there is plenty of work to keep them busy.

In presenting the advantages and disadvantages of these two plans for the preparation of shop drawings, it would be well to call attention to some intermediate plans which have been found of advantage in certain cases. Briefly these consist of various forms of close co-operation between the office of the railway bridge engineer and the drafting room of the fabricator. In the case of one of the largest railroad bridges built in recent years, the bridge engineer desired to have the shop drawings prepared in his own office where he could keep in close touch with the work, but, to insure that the plans would be completed in a way that would facilitate the shop work to the utmost, an arrangement was made whereby a squad foreman from the bridge shop drawing room supervised the work in the railroad office. Another and probably more common practice for accomplishing the same results, is to have the man who designed the bridge for the railroad assigned to the bridge company's drawing room during the time that the shop plans are in preparation.

The Proposed Advances in Railway Wages

THE REPORT of the Railroad Wage Commission, which was appointed by Director General McAdoo soon after the adoption of government control of railways, was made public last week. The appointment of this commission and the assignment of its duties constitute one of the best pieces of work Mr. McAdoo has done since he has been director general. The commission was instructed not merely to investigate and pass upon the claims of railway employees who had complained about their wages, but to investigate and make recommendations regarding what ought to be paid to all classes of employees. The selection of Secretary of the Interior Franklin K. Lane as chairman was ideal, and the rest of the personnel of the commission was good.

The report and recommendations made are what were to be expected from a body having such high character and which was given the opportunity it was to deal in a big way with so important a problem. The commission did not attempt to decide the many difficult questions which can be raised as to the reasons why some classes of railway employees receive much higher wages than other classes, and as to just what the relationship of the wages of the various classes should be. Nor did it give any weight to the amount of organized pressure which any particular class had brought or could bring to bear in support of its demands. It did recognize the "one dominating fact," to which attention repeatedly has been called in these columns, that the lower grades of railroad employees are paid much less in proportion than the higher grades. Therefore, it recommends an advance of 43 per cent with a minimum of $20 a month, in the wages of all employees receiving less than $50 per month, and smaller percentages of increase for the higher paid. For example, employees who were receiving from $51 to $75 a month on December 31, 1915, would under its plan receive an advance of 41 per cent, those receiving $115 a month, 25 per cent, those receiving $239 a month, 4.56 per cent; while employees receiving $250 or more would receive no advance at all.

As above indicated, the proposed advances are not based on the wages being paid at present but on those which were being paid in December, 1915, and they are predicated almost entirely on the increases in the cost of living which have occurred during the last two years. The commission made a thorough investigation and found that the increase in the cost of living had been about 40 per cent. It will be seen, therefore, that under its plan the advance in the wages of the lowest paid employees would be in proportion to the increase in the cost of living since 1915, while for the higher paid employees the advance would be less, and for the highest paid much less, in proportion, than the increase in the cost of living.

The commission was not empowered to determine what should be done, but merely to make recommendations to Director General McAdoo. It will hardly be questioned by any humane and well-informed person that the advances it recommends should be made. They ought to be made as a matter of justice to railway employees. They practically must be made as a matter of public expediency, because the wages paid by the government and by other large industries are so large that without further advances in railway wages the roads cannot hold enough men to operate efficiently.

The advances which the Railroad Wage Commission recommends would aggregate about $300,000,000 a year. That part of the press which is bent upon using all the results of government control that it can as an argument for government ownership is exploiting them as evidence of the fairness and generosity with which railway employees may expect to be treated under government ownership, the implication being that under private management the railways made practically no advances in wages. Those who discuss the subject in this way ignore a significant statement made by the Railroad Wage Commission. This appears on page 13 of its report, and is as follows: "It is hardly realized that the roads themselves have in two years, 1916 and 1917, increased wages approximately $350,000,000 per year if applied to the present number of their employees."

It is worth while in this connection to review the advances in wages which the railways have made over a still longer period. The system of federal regulation which prevailed until it was supplanted by government control was adopted in 1906. In the fiscal year 1906 the average wage paid to railway employees was $588. In the calendar year 1917, as shown by the Wage Commission's report, the average wage per employee of the Class I roads was $988. The Class I roads had 1,939,399 employees in 1917. The increase in the average annual wage having been $400, it follows that in 1917 the Class I roads paid to their employees $775,760,000 more than they would have if the average wage had been the same as in 1906.

The increase in the average wage between 1906 and 1917 was 68 per cent. Meantime, the average passenger rate remained about stationary and the average freight rate declined from 7.48 mills in 1906 to 7.15 mills in 1916, the last year for which the figure is available. The advance in wages recommended by the Railroad Wage Commission would amount to $288,000,000 for the Class I roads, and would make the average wage paid by them $1,137 a year. This would represent an advance over the average wage of 1917 of 15 per cent. During the period of 11 years when the railways under private control were being steadily forced to make large advances in wages their managers repeatedly went to Washington and appealed to the Interstate Commerce Commission for offsetting advances in rates. The commission in most cases told the managers to go home and manage their railways more efficiently; and that thereby they would be able to effect economies which would offset the increased expenses. The railway managers returned home as bidden, and they did achieve increases in efficiency which enabled the companies to absorb most of the advances in wages and other expenses. They were not able, however, to absorb anywhere near all of them, and, in consequence, the ratio of expenses to earnings constantly increased and the percentage of operating income earned constantly decreased.

The railroads are now under government control. What will the Interstate Commerce Commission say to the Director General of Railroads if and when he makes advances in rates to offset the advances in wages and other expenses which are occurring under government control?

The Heavy Losses of Railway Net Income

HOW CLOSE THE RAILWAYS of the United States were to financial disaster when government control was adopted is shown by statistics regarding their earnings and expenses in the first three months of 1918, which have been compiled by the Interstate Commerce Commission. The statistics in question are for only 114 roads operating 165,258 miles, but probably they accurately forecast what the figures for all lines will disclose when they are available.

The reports of these 114 roads show that in January, February and March their total earnings were $726,000,000, an increase of almost $38,000,000 over the same months of 1917. Their operating expenses, however, were almost $638,000,000, an increase of $125,000,000 over the same months of 1917. In consequence in these three months these roads suffered a decline of almost $87,200,000 in net revenues. Their net revenues in the first three months of 1917 were $175,400,000, while in the first three months of 1918 they were only $88,200,000. The decline in their net earnings in these three months was almost 50 per cent. The ratio of their operating expenses to their earnings increased from 74½ per cent in the first three months of 1917 to 80 per cent in the first three months of 1918.

The statistics of "operating income" have become unusually interesting recently because the compensation the government is to guarantee the companies for the use of their properties is based on the average operating income earned by them in the three years ended on June 30, 1917. Operating income is what is left of earnings after the payment of expenses and taxes, including "war taxes." In the first three months of 1917 the operating income of these 114 roads was $144,000,000, while in the first three months of 1918 it was only $54,000,000, a decline of $90,000,000 or 60 per cent.

The railways in all three territories, eastern, southern and western, had increases in their total earnings, but still greater increases in their operating expenses and taxes during these three months, with the result that in every territory there was a heavy decline in operating income. The showing made by the eastern lines, however, was much the worst of all. In the first three months of 1917 these railways earned almost $56,000,000 in operating income, while in the first three months of 1918 they did not earn any operating income at all, but had an actual deficit in this item of over $1,000,000.

Relatively the greater parts of the increase in operating expenses, and the loss in operating income, were due to the severe weather and difficult operating conditions in January and early in February. In March, however, the weather was very good and still the increase in operating expenses was so great as to cause declines in net revenue and in operating income. The total operating revenues of these 114 roads in March, 1918, exceeded $284,000,000, an advance over March, 1917, of almost $36,000,000. Their operating expenses, however, increased about $42,000,000 over the same month of last year and in consequence there was a decrease of net revenue of over $6,000,000. The operating ratio of these roads in March, 1917, was less than 72 per cent, while in March, 1918, it was over 77 per cent. In March, 1917, their operating income was almost $57,600,000, while in March, 1918, it was only $50,630,000.

These statistics do not tell the whole story even for the roads on whose reports they are based. A general advance in railway wages is soon to be made and it will be retroactive to January 1. This will add about $25,000,000 a month to operating expenses or approximately $75,000,000 to the expenses of these three months. This will wipe out all of the operating income earned in the first quarter of the year.

When railway security owners and railway managers contemplate these statistics they may well breathe a sigh of relief because at the commencement of the present year the government relieved them of the responsibility of providing for the financial requirements of the companies. It might be interesting, but it would be futile, to speculate as to whether the increase in operating expenses would have been so great if the railways had been left under private control. If private control had been retained there certainly would have been a very great increase in operating expenses and probably many of the railways, including some of the largest systems, would have been thrown into bankruptcy, and there would have been a financial cataclysm in this country. The increases in expenses were coming very fast in 1917, especially during the latter part of that year, under private control, and no human ability or energy could have prevented them from continuing to come. Whether it was or was not desirable for the government to assume control of the operation of the railways is a question which is still debatable; but that for the protection of the railway companies and the country it was necessary for it to come to the rescue of the companies financially, there can be no doubt.

These great increases of operating expenses which were occurring when government control was adopted, which have come still faster since it was adopted, and which promise to continue at an accelerated rate, throw light on some questions which were much agitated before the adoption of government control. One of the most important of these is that of advances in rates. When the reports of earnings and expenses in February, 1917, began to come in, the managers of the railways, especially those of the eastern lines, became much frightened and appealed for a 15 per cent advance in rates. They submitted during the ensuing weeks much testimony and statistical data to show that the increases in expenses were sure to continue and to become larger because of the rapid advances in wages and labor and in the prices of materials and fuel. The Interstate Commerce Commission, as usual, heard them with doubt and suspicion, decided that they were unduly alarmed, and in June granted only part of the advances asked for. Subsequently the case was reopened, and finally in March, after government control was adopted, the commission granted the eastern lines practically all the advances in rates they had originally sought. By that time, however, the increases in expenses had so completely justified the ominous anticipations of the railway managers that an increase of 15 per cent was entirely insufficient.

With expenses increasing as they are and with an enormous advance in wages to be added to them, it is evident that the Railroad Administration will very soon have to make a large advance in rates or be confronted with an enormous deficit. Theorists regarding railway matters have contended that very large economies could be effected by operating the railways of the United States as a single system. One of these doctrinaires estimated in his testimony before the Newlands committee that a saving of $400,000,000 a year could be made in this way. It is possible that by unified operation savings amounting to as much as one-fifth or one-fourth of this amount may be made, but when all of them that can be made have been made they will be small compared with the increases in expenses produced by advances in wages and prices, and by other causes.

It is assumed that the total compensation guaranteed by the government to the railway companies will be about $950,000,000 a year. If the operating results of the first three months of the year indicate what results may be expected during the rest of the year the operating income of the roads in 1918, *in the absence of any advances in rates or of wages,* would be insufficient by at least $500,000,000 to pay the guaranteed compensation. The proposed wage

increase of $300,000,000 would increase the deficit to $800,000,000 a year. It is evident that the Railroad Administration is facing a very serious situation.

It would be highly undesirable from every standpoint to allow the railways to have a huge deficit which would have to be paid in taxes. Therefore, steps ought to be, and, indeed, already are being taken toward general advances in both passenger and freight rates much greater than any ever heretofore suggested.

Is It Necessary for the Roads to Use Bessemer Rails?

IN AN EDITORIAL entitled "Shall the Roads Return to Bessemer Rails" published in the *Railway Age* of May 3, we referred to the reports emanating from Washington to the effect that the railways would be required to use Bessemer instead of open hearth rails this year, and urged that this be done only after a legitimate effort had been made to use the Bessemer steel output for those essential military purposes where it could be employed without detriment so that, if possible, the roads would not have to return to a grade of steel which they had discarded in large measure in recent years as inferior, both in wearing qualities and breakage. In its issue of May 9, the Iron Age takes exception to these statements in an editorial which implies that (1) the transition from Bessemer to open hearth rails was made at the instance of the roads, (2) that Bessemer rails are not inferior to open hearth for service and (3) that there has been practically no reduction in the Bessemer production capacity of the steel mills of this country, and that it is necessary to roll the Bessemer steel in order to utilize the capacity which might otherwise be idle.

We do not question the advisability of reverting to Bessemer rails if the open hearth steel output of the country is actually needed for war purposes for which Bessemer steel will not serve as well. However, we do think it a mistake to take this backward step until it is shown that a legitimate effort has been made to substitute Bessemer for open hearth, where this can be done without detriment to service or to production capacity. As we stated in the previous editorial existing practices should not be disturbed unless such disturbance will contribute to the success of our military efforts.

The Iron Age implies that the transition from Bessemer to open hearth was made at the instance of the roads. It also takes exception to our reference to the depletion of "high grade" (used in the sense commonly understood in this connection, viz., a low-phosphorus content) ores and makes the statement that "much Bessemer ore is available and it is of such character as to produce as good Bessemer steel as formerly." These statements are surprising in view of the fact that it has been common knowledge among all familiar with the negotiations between the manufacturers and the railways during the last ten years that the manufacturers have pointed out to the roads the necessity of going to open hearth steel for at least a large proportion of the rail requirements because of the unquestioned depletion of low-phosphorus ores. As early as 1908, the Committee on Standard Rail and Wheel Sections of the American Railway Association reported that "In the matter of chemistry specifications for Bessemer steel rail statistics were obtained from the officers of the Ore Producers' Association which convinced the committee that it would be impossible for the mills to furnish more than a small percentage of the total rail requirements of the railroads with a phosphorus specification less than 0.10 (per cent). . . . Members desiring to obtain low phosphorus rails will have the further option of using open hearth steel. The committee conferred with a number of disinterested experts . . . on the phosphorus question. These gentlemen all agreed that . . . it would be unreasonable to require less than 0.10 (per cent) phosphorus in a specification for Bessemer rails intended to cover purchases for all American railroads." The importance of the phosphorus content lies in the fact that the Bessemer process does not affect the amount of this element originally contained in the iron, while in the open hearth process the phosphorus can be easily removed to the desired point, enabling iron high in phosphorus to be used.

Further on, the Iron Age brands as untrue our statement that "a return to this class of steel (Bessemer) can only be made at the sacrifice of service and of safety in the track," the implication being that the Iron Age contends that Bessemer rails do give as good service as open hearth. Such a statement indicates a lack of knowledge regarding the service of steel products which is surprising. It is common knowledge among railway men that open hearth rails give a life considerably greater than Bessemer rails, and this life is commonly estimated as approximately twice that of Bessemer rails. Further, with respect to safety the best information regarding breakage is that contained in the annual analyses of rail failures made by the American Railway Engineering Association. In its latest report for the year ending October 31, 1916, and published in Bulletin No. 199, dated September, 1917, the failures are classified according to their years' service in the track as follows:

FAILURES OF OPEN-HEARTH AND BESSEMER COMPARED

Year Rolled	Failures per 100 track miles		Comparative failures	
	Open-Hearth	Bessemer	Open-Hearth	Bessemer
1911	161.9	214.1	100	132
1912	74.2	107.7	100	145
1913	43.3	60.1	100	135
1914	18.9	32.3	100	171

This report also states that "It will be noted that the failures of Bessemer rails per 100 track miles were considerably greater than those of the open-hearth rails." It is probably also true that the open-hearth rails were, in general, in more severe service, so that the actual difference under the same conditions may have been greater.

Furthermore, the best evidence that open-hearth rails are superior to Bessemer is the fact that the roads have been willing to pay the premium of $2 per ton which the mills have charged for these rails and at the same time the ratio of open hearth rails to the total has risen until in 1916 (the latest year for which the figures have been made public) over 80 per cent of all the rails rolled were of this character.

The Iron Age also challenges the statement that "the reduction in the Bessemer capacity of the country which has taken place also acts as a controlling factor," and goes at length into an effort to show that there is a large Bessemer capacity in this country which can be utilized to manufacture rails at present. To intimate that mills such as the Ohio works of the Carnegie Steel Company and the Lorain Steel plant are available for the rolling of rails, when they have not been so employed during recent years when the steel manufacturers have been more congested with orders than at any previous time in their history and when manufacturers now have 2,000,000 tons of rails on order, a large part of which are overdue, only serves to becloud the issue. It is to be assumed that, owing to the urgent demand for steel for government and other uses, all of the steel mills of the country have been and are working to their maximum capacities, and that those which have Bessemer as well as open hearth furnaces are operating them in a manner to produce the maximum tonnage. This is borne out in the statement of the Iron Age itself of April 25 that the leading producer in the Pittsburgh district was operating to 98 per cent of its Bessemer and open hearth steel capacity, although in the more recent editorial an attempt is made to convey the impression that this plant has a Bessemer capacity available

for rails of 1,000,000 tons. In view of its own statements that the plants are working to capacity it is difficult to understand its attitude in its issue of May 9, in which it urges the substitution of Bessemer for open hearth rails as a means of "utilizing our steel making capacity."

One need only turn to the statistics of the American Iron and Steel Institute (the association of the steel manufacturers) to verify our statement that there has been a reduction in the Bessemer capacity of this country in recent years. The proceedings of this institute for 1916 (the latest available) show a capacity of 12,054,658 tons, a reduction of 2,410,067 tons or 17 per cent in the one year. It is difficult to reconcile the implication of the Iron Age that there has been no material reduction in the Bessemer capacity with these figures.

If the steel mills of this country were free to disregard other orders, there is no question but that they could roll a sufficient tonnage of Bessemer rails to meet the demands of the railways which J. Leonard Replogle, director of steel supply of the government, stated a few days ago have been placed at 2,000,000 tons by the Railroad Administration. However, this is not the situation. The mills are overwhelmed with orders, and it has become necessary to separate the essential from the non-essential and to adopt other expedients to increase production. To take a Bessemer converter now employed in duplexing in the open hearth process from this service and allow it to make straight Bessemer rail steel will gain little in ultimate tonnage. Likewise, the rearrangement of plant operation which would be necessary to roll rails at another mill referred to by the Iron Age as having 250,000 tons rail capacity and three times this of Bessemer steel making capacity would be so radical as to result in a reduction of tonnage in other departments probably as great as that gained in Bessemer steel. Therefore to refer to such plants as being available for the manufacture of rails only serves to becloud the issue and in no way assists in increasing the output. The fact that the mills have not followed this suggestion in the time of their greatest congestion and accumulation of orders indicates that the expedient offered by the Iron Age has not been taken seriously by steel makers.

The problem now confronting the steel mills of this country is that of producing the maximum tonnage of rails and other essential materials. This cannot be done while methods are being changed with the resulting disorganization of forces. Bessemer rails have largely ceased to be rolled for heavy sections. To return to them under present conditions would, therefore, appear to be unwise from the standpoint of the mills as well as of the roads unless it is necessary solely as a war measure.

New Books

Regulation of Railways. By Samuel O. Dunn, Editor of the Railway Age. 354 pages, 5¼ by 7½ in., bound in cloth. Published by D. Appleton & Co., New York. Price, $1.75 net.

This book really covers three different phases of the railway situation in the United States. It describes the conditions which existed on the railways during the last year before this country entered the Great War and the first year after it entered the war, and tells of the work done by the Railroads' War Board in the effort of the railways voluntarily to co-ordinate the operation of their facilities, and of the events which led to the adoption of government control. It shows that the railways had become unable because of the reduction of their net earnings, their arrested development and restrictive laws, to solve without some form of government assistance the problems presented to them by this country's entrance into the war.

Having reviewed the developments which more immediately preceded the adoption of government control, the book shows that these developments were very largely, and even mainly, the result of the policy of regulation of railways which had been followed in the United States since 1906. In other words, government control was precipitated at the end of 1917 by the rapidly rising expenses of the railways, the inability of most of them to raise new capital, the inadequacy of their facilities and the fact that laws designed to enforce competition between them hampered them in making the arrangements necessary in order to secure the kind of operating efficiency needed to enable them to meet war conditions. It is pointed out, however, that their declining net earnings, the inadequacy of their facilities and their inability to operate as far as it was desirable as a single system were due to the system of regulation which had been applied to them in spite of every effort which the managers could make to secure reforms in regulation.

It is assumed that, as the railroad control law specifically provides, government control is to be used exclusively as a war emergency measure, and that therefore the question of what shall be done with the railways after peace has returned is entirely unsettled. The experience of the past affords the best guide as to what ought to be done and what ought to be avoided in the future. Therefore about one-half of the book is devoted to an account and a discussion of the policy of railway regulation followed up to the end of 1917. The headings of the chapters in this part of the book indicate the nature of their contents and are as follows: "What Is the Matter with Railway Regulation?" "Functions of Government in Relation to Railways," "Commission Versus Legislative Regulation," "Federal Versus State Regulation," "Regulation of Rates," "Valuation in Relation to Regulation of Rates and Securities," "Regulation of Securities," "Regulation of Railway Operation."

The author outlines the reforms in regulation which he believes should be adopted if the railways are to be returned to private management after the war. He recognizes the fact, however, that there probably will be a great struggle over the question whether they shall be returned to private management, or government ownership and management shall be adopted. Therefore, a large part of the book is devoted to discussion of the general subject of "Government Regulation Versus Government Ownership." The headings of the chapters dealing with this general phase of the matter indicate their contents, and are as follows: "Railway Ownership and National Defense," "Efficiency of Production as Affected by Private or Government Management," "Equity of Distribution as Affected by Government Management or Government Regulation," "Some Political Phases of Government Ownership," "The Failure of Government Ownership in Canada."

In the last two chapters of the book the discussion which has preceded is summarized. The general conclusion reached is against government ownership and in favor of private management subject to an improved system of regulation. The changes which should be made in regulation if the railways are to be managed in the future as heretofore, as numerous separate systems, are outlined. The fact is recognized, however, that it may be considered undesirable by both the government on the one side and the owners and managers of the railways on the other, for the railways to be operated in future as many separate systems, as has been the case in the past. Therefore, a plan is tentatively outlined for the reorganization of the railways into five to ten regional groups, each of which group would be owned by a regional holding company.

The book is strictly up to date in point of both the information and the discussion in it, as it was finished, and all parts of it which had been previously written were carefully revised, after the adoption of government control of railways

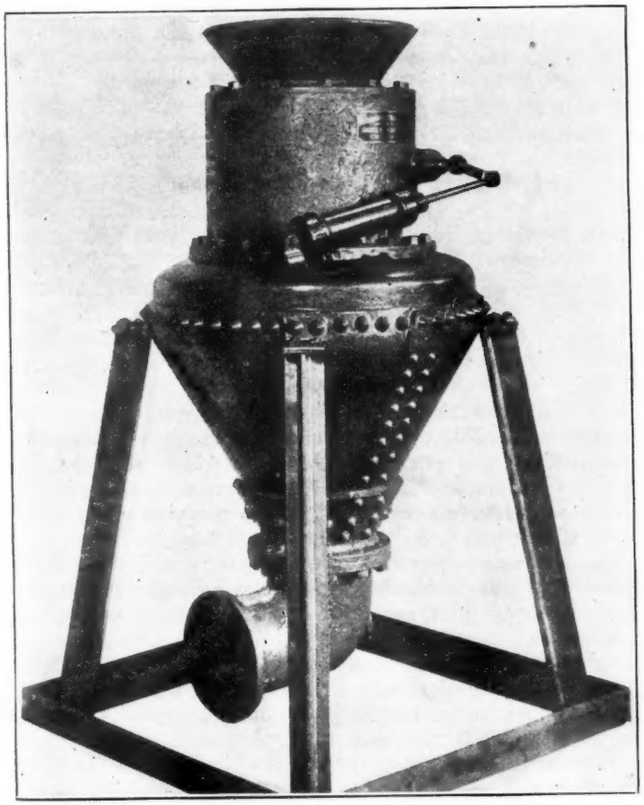
A Discussion of the Pneumatic Method of Concreting*

Describing the Equipment Used and Illustrating Practical Applications of the Process

By H. B. Kirkland
President, Concrete Mixing and Placing Company, Chicago.

THE PNEUMATIC METHOD of mixing, conveying and placing concrete is a comparatively recent development in engineering methods of construction. This method should not be confused with the cement gun process, which is a plastering process and is entirely different in operation and purpose. Both methods are patented. The pneumatic method is adapted for heavy, difficult concrete work, using ordinary ingredients with aggregates up to 4 or 4½ in. in diameter.

Briefly described, this method consists simply in blowing



The Pneumatic Mixer

batches of concrete through a pipe from a central point of supplies to their place in the concrete forms. The materials for a batch of concrete (½ cu. yd.) are proportioned in a measuring device and dropped into the pneumatic mixer without previous mixture.

Equipment

The plant for pneumatic mixing and placing consists of a mixer, a pipe conveying system and a compressed air plant. The mixer consists of a steel shell having the shape of an inverted cone surmounted by a cast steel cylinder in which a door is operated by a small air piston. The door is opened by releasing the air in the cylinder, allowing it to drop open by its weight. At the bottom of the inverted cone chamber is a 90-deg. elbow which forms the connection to the discharge pipe. The door and piston is the only moving part of the mixer and the inside contains no mechanical mixing apparatus and is entirely smooth and free from obstructions. An air jet located at the heel of the bottom elbow of the mixer is the prime means of conveying and mixing the concrete. It is supplemented by other air jets located at the top of the mixer. The main air jet is directed into the center of the discharge pipe where it catches the material as it falls from the cone-shaped hopper above. The upper air jets create a pressure from above the batch, forcing it downward into the discharge pipe where it is caught by the main jet. To admit air to the mixer, two valves are used, one located on the air supply line leading to the lower jet and the other on the line leading to the upper jets placed above the level of the batch.

In operating, after the batch containing cement, aggregate and water is placed in the mixer, the door is closed and the main jet is opened. This is followed by opening the valve to the upper air jets. Many operators vary this method but the effect of this sequence of control is to start the batch forward at the bottom of the machine, detaching successive portions of the batch at the tip of the cone. The materials in the mixer flow downward in the same manner that sand flows from the upper chamber of an hour-glass, but the speed of the flow is accelerated by the air pressure.

The conveying pipe consists of any standard smooth steel pipe with joints made with bolted flanges or any type most easily and rapidly handled in making connections. The most rapid wear on the pipe occurs at the points where there is apt to be a slight irregularity or a shoulder. Threaded pipe is also thinner where the threads are cut and of course wears through there first. For making deflections of the pipe line, cast elbows are used. An ordinary cast iron elbow will last sometimes less than a day, but a case-hardened steel elbow will usually last a few weeks. The best elbow is cast manganese, which will almost outlast the pipe itself. These elbows are made in 45 deg. with a thickness of 5/8 in. on the inner curve and 7/8 in. thickness on the outer curve. This gives a weight of about 220 lb. for an 8-in. elbow. The radius of the elbow is 3 ft. minimum, as a shorter radius is too sharp a turn and causes plugs in the line. Shorter radius elbows may be used, however, at the discharge end of the pipe. A split elbow of 90 deg. has also been used for 6-in. pipe. This elbow is split lengthwise so that the outer half of the curve which usually wears rapidly may be replaced.

A means of deflecting or guiding the discharge of concrete in the forms consists of a series of slightly tapered pipes, fitting together like stovepipe. Two or three sections of this light pipe about three or four feet long are all that are needed in a tunnel form for diverting the discharge from one side wall to the other and for guiding the concrete discharge around points of rock projecting from the roof. Where the tunnel is very wide, however, as in a double track railroad tunnel, a wye branch is used in the line, so there are two lines of pipe entering the tunnel form. A side valve or gate is placed in the wye for diverting the batches through one line or the other.

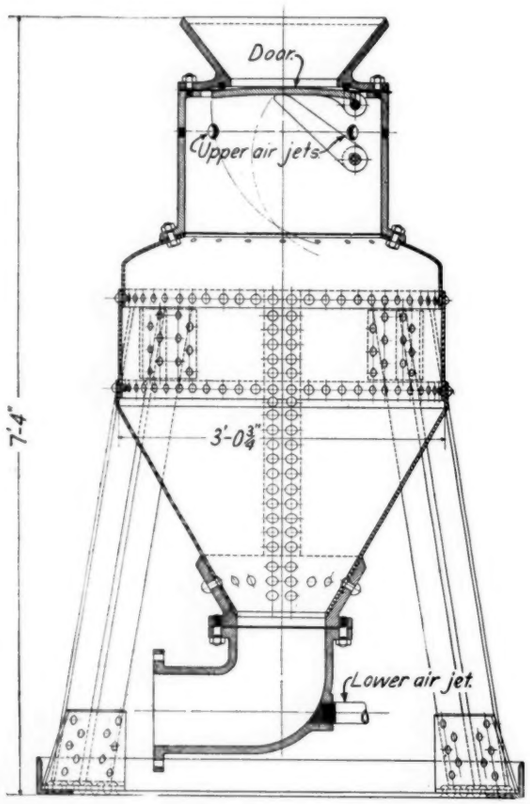
A suitable type of compressor is used and the one ordi-

*Abstracted from a paper presented before the Western Society of Engineers, Chicago, May 13.

narily employed is a straight line, one- or two-stage machine, compressing to 80 to 125 lb. per sq. in. The motive power may be steam, oil or electricity as is most economical under the conditions prevailing. When possible it is desirable to locate the plant near the mixer, but it is necessary to provide air storage close to the mixer sufficient at least to store enough air to discharge a batch of concrete at the maximum distance required. This storage should be at least 100 ft. capacity with 30 cu. ft. capacity added for each 100 ft. of pipe line. There should be additional storage at the compressor if the mixer is located a considerable distance away (for example, more than 300 ft. away).

The amount of air required to convey concrete depends upon the specific gravity of the materials, the smoothness of the pipe, the number of bends in the pipe line and their radii, the distance conveyed vertically and horizontally and upon the pressure or velocity of the air used. For the standard size mixer this is about 2 cu. ft. of actual free air compressed to 100 lb. per sq. in. per lin. ft. of pipe per batch. In other words, to convey one batch 500 ft. it will take 1,000 cu. ft. of actual free air compressed to 100 lb.

Based upon this figure, the diagram shows the amount of air required to convey concrete at various distances. This curve is based upon practical observations on a number of



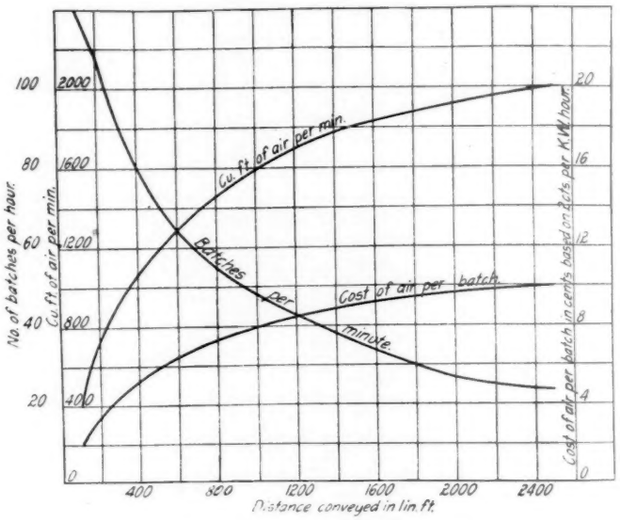
Vertical Section of the Mixer with the Door Closed

jobs, and certain assumptions have also been made in order to complete the figures. It is assumed in this curve that certain conditions of the concrete operations are as follows: 20 sec. are allowed for opening the door and charging the mixer after each batch has been discharged and the air valves closed; 5 sec. are taken as the length of time to convey a batch each 100-ft. and as the distance becomes greater the number of batches per hour decreases until at 2,500 ft. the number is 24, and the amount of air at this distance is 2,000 cu. ft. per min. It should be borne in mind that if it is desired to get the maximum output possible the capacity of the compressor should be great enough to build up the air pressure in the storage tank in the time required to shoot a batch.

The Mixing Process

One of the first questions asked by the engineer is, "How is the concrete mixed?" This is explained by a study of the conditions which affect the batch from the time it is placed in the mixer until it is delivered in place in the forms.

In loading the mixer the ingredients, cement and water, are usually placed in a measuring hopper, so that when the hopper is emptied into the mixer the first commingling of



Air Consumption and Cost of Air

the ingredients takes place. This first commingling is not particularly important, as it is very slight. When the air is turned on that portion of the batch which is at the bottom of the mixer, in front of the conveying air jet, is first to move and is instantaneously followed by portions dropping from above. As the mixer has the shape of an hour glass, the central portion of the batch in the mixer flows down first, and the portion in the sides follows in the stream from the upper part, exactly as sand flows in an hour glass. During this operation the mingling of the different ingredient parts causes the smaller ingredients to flow into the voids between the larger ingredients. As the portions of the batch drop into the lower air stream, which has a velocity of about 5,000 ft. per sec., these portions are carried along in suspension much as dust is carried along in a storm, except that the particles are much closer together. Although the speed of the air jet is very high, the speed of the concrete materials is much lower. The speed of the concrete varies according to the amount of voids in the materials which permit the air to pass through. The air in passing through tends to carry with it the smaller ingredients; that is, the sand tends to fill the voids between the rocks and the cement tends to fill the voids remaining, and, as the voids become filled up with the smaller ingredients passing through, the speed of the mass increases, the pressure of the air behind the mass increases with the decrease of the voids in the mass, and the speed of the mass concrete increases.

Now, in this explanation of the mixing process, I have assumed that the air velocity passing through the pipe is sufficient to keep the materials in suspension, and it is important to have a sufficient air pressure to keep the materials in suspension, because when the air velocity is reduced the

materials simply roll and tumble along the bottom of the pipe. The concrete will also mix in this manner, but it is not conducive to good operation and makes a dirty pipe line, which is liable to become plugged. In shooting concrete, therefore, it will be found that with an 8-in. pipe and with materials of the specific gravity of limestone, the pressure should not fall below 50 lb. per sq. in., as the materials will then commence to drag along the pipe. Any air expended below 25 lb. is wasted when blowing concrete through an 8-in. pipe.

Three general types of pneumatic installations have been developed through the requirements of different classes of work. These are central plant or scheme of locating the mixer at a central point from which the conveyor pipe is laid to the forms, portable plant or outfit upon which the mixer is carried and is either loaded from bins carried on the same conveyance or supplied by a belt or other loading device, and the scheme of loading the mixer at various points as at the bottom of manholes in shallow tunnels and supplying it with materials through a chute from the various corresponding points along the surface. The last is a form of central plant made semi-portable.

Doings of the United States Railroad Administration

Rate Increases Expected Shortly; Proposed Amalgamation of Railroad Associations; Information for Shippers

WASHINGTON, D. C.

ALL SIGNS POINT to early action by the Railroad Administration to bring about a general increase in both freight and passenger rates and while those who are in touch with the work that is being done in that direction are not talking about it, there is no attempt to deny the statements which are being published that the amount of the proposed advance will be such as to make railroad officers who have on several occasions spent a year or more at a time in efforts to secure increases of 10 or 15 per cent, marvel at their timidity. An examination of the available figures of railroad earnings and expenses for the first three months of this year, although the complete figures have not yet been given out, when taken in connection with the proposed $300,000,000 wage increase, is enough to show that the kind of relief the railroads used to ask when they were facing a similar situation would amount to merely a drop in the bucket under the present conditions.

Based on these figures, rough estimates are being made that a deficit of from $800,000,000 to $1,000,000,000 would be shown for the year, and while it may be expected that operating conditions will be more favorable than they were in January, February and March, there are many other factors, such as the prospective increase in the price of coal, which will tend to keep expenses on an upward trend. Figuring in this way it is easy to reach a conclusion that an increase of at least 25 per cent in freight rates and an increase in passenger fares from an average of about 2 cents to 3 cents a mile would hardly more than meet the situation even if the increases could be made available throughout the year. On the contrary the operating deficit, when the wage increases are put into effect as of January 1, will have prevailed for about six months before any relief can be expected from rate increases if they can be made available by July 1. Based on last year's earnings a 25 per cent increase in freight rates would amount to about $700,000,000, while a similar increase in passenger fares, on the assumption that a basic rate of 3 cents a mile would increase the average rate by no more than that proportion, would add about $200,000,000 more, making a total of $900,000,000.

It is understood that a report recommending the increase in passenger fares is now about ready for the director general's consideration and that the matter of freight rate increases is being worked out by the various committees that have handled similar subjects for the railroads in all parts of the country. It is stated also that Mr. McAdoo has given some consideration to the matter, although he has been confined to his home by illness ever since his return from the Liberty Loan tour. He has not yet acted upon the report of the Railroad Wage Commission, and no definite announcement as to rates is expected until he has, but as soon as the wage increase is an accomplished fact the rate matter will probably take definite shape.

Under the terms of the railroad control bill the President, who has delegated his authority to the director general, may initiate increased rates and have them put into effect at once by filing with the Interstate Commerce Commission a certificate that the increases are necessary to defray expenses, after which the Interstate Commerce Commission may enter upon an investigation as to the reasonableness of the rates. Nothing is said in the law about any investigation by state authorities nor has any one suggested audibly that the state commissions be consulted in the matter. In fact there is a general belief that a part of the increase is to be accomplished by leveling up state rates to the interstate basis.

In order that agencies or lines publishing tariffs may be prepared to make quickly any changes in rates that may be decided upon, all publishing agents, bureaus and individual railroads under government control, that publish tariffs have been requested to prepare an analysis of freight tariffs which contain rates or charges applicable on intrastate traffic only, including tariffs filed with the Interstate Commerce Commission, which contain such rates and tariffs filed with state commissions but not filed with the Interstate Commerce Commission. The circular letter says: "The purpose of this analysis is to have ready at the earliest possible moment a detailed statement of the tariffs or tariff items which may have to be amended, cancelled, or filed with the Interstate Commerce Commission as amended, to eliminate conflictions, bring all rates to a new basis and have one rate and only one published for each service, and that rate applicable on all business, both state and interstate, and filed with the Interstate Commerce Commission."

Furnishing Information to Shippers

Edward Chambers, director of traffic for the Railroad Administration, has addressed a letter to the regional directors giving instructions, to be carried out under their direction, for rendering the service to the shippers formerly performed by the off-line traffic offices in the way of furnishing information. The letter, which refers to his previous letter of April 3 in connection with the director general's order on the subject, follows:

"There seems to be some alarm on the part of the shipping public that they are not going to receive from the existing traffic organizations as complete and satisfactory service as heretofore given in the larger cities together by the home railroad offices and foreign line offices, the changed conditions now placing the responsibility for the entire serv-

ice upon the home line office. It was suggested in my letter above that the latter equip itself so as to be in position to render service completely.

"In the principal commercial centers railroads have joint tariff bureaus fully equipped with expert tariff men. The tariff files in these bureaus can be readily adjusted to contain all the rate information which the business interests in the particular city or territory may need. They are the very best source for proper and correct tariff information. For example, either Central Freight Association or Western Trunk Line office in Chicago could readily and with very little additional expense carry a complete set of the principal tariffs of all railroads placing itself in position to answer all inquiries promptly. This in addition to the tariff files in the general offices of individual lines would, I am sure, fully satisfy the need of the shipping public. The principal tariff bureaus are located at New York, Chicago, St. Louis, Atlanta and San Francisco with sub-bureaus in most of the larger shipping sections. The sub-bureau could also be equipped with such tariffs as necessary in the section of the country it covered.

"As to passing reports on high class non-perishable traffic, this is a service the responsibility for which is largely upon the individual line and is a necessary service to the shipper but not to the extent, however, that it has been given in the past under competitive conditions. Traffic officers of railroads should be instructed to confer with interested shippers for the purpose of determining the information of passings needed by the shippers. It should be a mail service. I do not anticipate any difficulty in shippers and carriers agreeing upon a plan satisfactory to both interests. The point at which the passing report should be made in the different sections of the country are well established by the practice of the past.

"As to passing reports on livestock and perishable traffic, this is largely a telegraphic service. The points at which these reports should be made have been established by long practice. The shippers' marketing plans are based upon them as well as the railroads' diversion arrangements. As to this service it is not necessary to continue the amount of telegraphing which has been done in the past and shippers do not now expect it. The responsibility for this work is also largely upon the individual carrier. I am sure from my discussion of the subject with representatives of shippers' organizations that no difficulty will arise to prevent a plan being adopted satisfactory to shippers and carriers alike with minimum amount of telegraphic service. Some consideration, I understand, has already been given this subject by carriers and shippers and it may be that arrangements have already been completed. I suggest in this connection that it is very desirable the routing through to destination so far as possible be shown on the waybills at the shipping point so as to have minimum of rerouting in transit of perishable traffic. This may be accomplished by traffic officials at point of origin keeping in close touch with the transportation conditions on railroads, particularly east of Chicago and Mississippi River, and advising shippers.

"As to tracing delayed freight, passing reports would save a vast amount of telegraphic inquiry for goods delayed in transit, but where evidence of unreasonable delay is presented to representative of any carrier in the through route of the freight, such representative should take whatever action might be necessary either using wire or mail to secure prompt information. For service of this character between agents of carriers no charge should be made to the shipper, but where inquiry is made by a shipper which requires answer by commercial telegram such answer should be sent at the expense of the applicant. There may be some objection by the shippers to this rule but unless there is a check of this kind, many duplications and unnecessary telegraphing will take place. Railroads should give special attention to this character of service. This rule should be uniform on all railroads.

"Many inquiries have been received as to where shippers, particularly in New York, would go to secure through bills of lading on export traffic via the Pacific ports after foreign line offices in New York City are closed, it having been the practice for many years for the representative in New York City of the Pacific Coast terminal line delivering the traffic to the water carrier at the port to take up the railroad shipping receipt and issue in its place a through export bill of lading. These bills of lading are generally negotiated through New York banks. Through rail and water bills of lading on export traffic today are practically confined to New York and to the routes via Pacific ports. I suggest Pacific Coast terminal railroads authorize Mr. C. C. McCain, secretary of the Eastern Freight Committee, to act as their agent in issuing these through export bills of lading. Mr. McCain's committee has taken the place of the Eastern Trunk Line Association. He is, therefore, equipped with a large office space and an organization which can properly supervise issuance of bills of lading. With comparatively little additional expense he can add to his present force, if necessary, a sufficient number of clerks experienced in this work who are now employed in the New York offices of the Pacific Coast terminal lines and who will shortly be released.

"I would like for you to get these matters shaped up as soon as possible because shippers are concerned regarding this service. It may, however, occur to either of you that a somewhat different plan would better serve the shipping interests in your section, in which event it will be satisfactory to me to have you work it out in your own way, but the tracing rules should be uniform."

Proposed Amalgamation of Railway Associations

The director general of railroads has started a movement for the amalgamation of the leading railway technical associations of the country. At his suggestion a meeting was held in New York on May 2 which was attended by the acting president of the American Railway Association and the presidents of the American Railway Engineering Association, the American Railway Master Mechanics' Association, the Master Car Builders' Association, the Association of American Railway Accounting Officers and representatives of some other organizations. The general plan was discussed at this meeting and the heads of the various associations were asked to prepare and submit to the executive committee of the American Railway Association their suggestions as to how the scheme could best be carried out. Their suggestions will be considered in about ten days or two weeks at a meeting of the executive committee of the American Railway Association. It is expected that after that a series of meetings of representatives of the various associations will be held and that finally a report with recommendations regarding the whole subject will be made to Director General McAdoo.

One plan which probably will be considered will be that of uniting all associations in a single organization. Another will be the establishment of relations between them, which will make the other associations subsidiaries of the American Railway Association. Under this plan recommended practice adopted by the subsidiary associations would be referred to the American Railway Association and if approved by it would be submitted to the director general. If the recommended practices received his approval they would, it is assumed, be put into effect and made obligatory upon all of the railroads.

In the past the various associations have adopted recommended practice, but as they have been unable to enforce their recommendations, in most cases they have been adopted

only by part, although in many cases a large part, of the railways.

Inland Traffic Service War Department

A reorganization of the Division of Inland Transportation of the War Department, effective on May 1, is announced in a circular just issued by H. M. Adams, manager of the division. The circular says in part:

Effective May 1, 1918, the Transportation Field Force of the Division of Inland Transportation will be known as the Field Force of the Inland Traffic Service, War Department, and branch and district offices, in charge of the persons indicated, will be located as follows:

New York Branch—Room 526, 45 Broadway, New York, N. Y.; B. M. Flippin in charge.

Albany District—1 Post Office building, Albany, N. Y.; Captain L. S. Lansing in charge.

Atlanta District—Forsythe building, Atlanta, Ga.; Captain F. E. DuBois in charge.

Baltimore District—Light and German streets, Baltimore, Md.; Captain S. A. Tubman in charge.

Boston District—25 Huntington avenue, Boston, Mass.; Captain E. H. Pillsbury in charge.

Buffalo District—530 Federal building, Buffalo, N. Y.; Captain L. M. Turnbull in charge.

Charlotte District—202 Mint building, Charlotte, N. C.; Lieutenant J. B. Beddingfield in charge.

Chicago District—Southern Pacific building, 35 Jackson boulevard, Chicago, Ill.; R. B. Robertson in charge.

Cincinnati District—213 Post Office building, Cincinnati, Ohio; Captain C. V. Link in charge.

Indianapolis District—314 Post Office building, Indianapolis, Ind.; Captain F. A. Leith in charge.

Jacksonville District—707 Heard building, Jacksonville, Fla.; Willis Callaway in charge.

New York District—Room 526, 45 Broadway, New York, N. Y.; Lieutenant Miles Ross in charge.

Philadelphia District—742 Weidner building, Philadelphia, Pa.; Captain S. A. Tubman in charge.

Pittsburgh District—Tenth floor, Chamber of Commerce building, Pittsburgh, Pa.; Lieutenant R. O. Roberts in charge.

Richmond District—425 Post Office building, Richmond, Va.; Lieutenant D. Mayer in charge.

San Francisco District—San Francisco, Cal.; Captain H. A. Manning in charge.

St. Louis District—826 Pierce building, St. Louis, Mo.; J. L. Hohl in charge.

Toledo District—415 Ohio building, Toledo, Ohio; Captain J. D. Anderson in charge.

The duties of those in charge are as follows:

Will represent the Inland Traffic Service in all matters within its jurisdiction.

Will promptly and effectively respond to all requirements of shipping officers of the War Department in matters pertaining to the securing of cars required and the movement of same, when loaded, subject to the methods of procedure established by the Inland Traffic Service from time to time.

Will exercise supervision at all depots, posts, camps, aviation fields, warehouses and other War Department institutions over matters within the jurisdiction of the Inland Traffic Service, including those pertaining to maximum loading of cars, prompt unloading of cars, demurrage charges, expediting the movement of property, tracing, freight rates, prompt accomplishment of bills of lading, etc.

Will periodically visit all points to and from which government property is shipped, review the methods and conditions prevailing, suggest such changes in methods as are necessary to establish a uniform system, and shall check and review the matter of accomplishment of bills of lading, requiring, when necessary, a check with the carriers or by other method, to determine whether or not unaccomplished bills of lading are held covering property which has been received.

Will, as the opportunity may offer, confer with railroad officials for the purpose of determining whether or not War Department property is being delayed en route, and for such other review of the situation as may be necessary from time to time.

The practice heretofore followed of tracing cars in person will be discontinued. The Railroad Administration will establish at Washington, D. C., on May 15, 1918, a Car Record Bureau wherein the shipment, interchange, junction passing and arrival at destination of government shipments in carloads will be recorded, and this record will be resorted to in tracing delayed shipments. Those in charge of Inland Traffic Service Branch and district offices will rely upon the Tracing Section of this office for data available from this record, and discontinue, so far as may be practicable, personal tracing of property shipments.

Will keep in touch with the situation at important centers and junction points, and will promptly report all congestion of railroad facilities involving government property and causes therefor.

Will review records of such express shipments of government property as may be made within their respective districts, and where such shipments appear to have been unnecessary, report the facts to this office for further action.

Will make such visits as may be necessary to the several ports within their jurisdiction, noting conditions, and render such assistance as may be necessary to avoid congestion, and make such recommendations as may be pertinent to overcome any apparent difficulty.

Will exercise and perform such other functions and duties as may be prescribed by the Chief, Inland Traffic Service, War Department, or by his authority from time to time.

The services of the branch and district offices are available to all bureaus of the War Department alike, and their activities will be exercised in connection with the property of all such bureaus without preference or prejudice.

New England Protest Against Abolition of Differentials

A large delegation of New England shippers called on the traffic department of the Railroad Administration last week to protest against the proposed elimination of the differential rates from New England to western points via the Canadian lines. All differential rail-and-lake rates have been abolished and the Canadian lines have been asked to concur in taking out their differentials from New England. The protest was based on the ground that some of the shippers are located directly on the differential routes and would be put to a disadvantage if their rates were advanced without relation to the rates of competitors in other localities.

Reduction in Western Passenger Service

Some additional details regarding the plan for a readjustment of passenger service on the western roads, which was described in last week's issue, are contained in an announcement issued this week from the office of the director general. The announcement states that the director general has approved the recommendation of Regional Director Aishton for a reduction in the train service west of Chicago amounting to 11,728,000 miles per annum, effective on June 2, and continues:

"This economy has been accomplished by abandoning duplicate service between Chicago and the Pacific Coast cities and assigning to the short and direct routes to each city the fastest through service. Under this plan the Atchison, Topeka & Santa Fe will be the preferred route to Los Angeles, Chicago & North Western-Union Pacific-Southern Pacific to San Francisco, Burlington-Northern Pacific to Portland and the Chicago, Milwaukee & St. Paul to Seattle.

The fast trains will make the run in 72 hours to each city. There will be a secondary train carrying all classes of equipment scheduled in 78 hours. The other trans-continental roads will operate such service as may be necessary to accommodate their intermediate travel on reasonable schedules.

"On the same date the mail schedules will be adjusted so that there will be a parity of mail service between Chicago and each of the rival commercial centers on the Pacific coast. The fast mail trains will cover the distance between Chicago and Pacific coast terminals in 65 hours.

"The public will be adequately served under the new arrangement, although it is probable that more upper berths will be sold in the future than in the past.

"The passenger committee for the Western district has now started working on the rearrangement of the schedules to the Southwest, where important economies can also be effected without affecting public convenience."

Steel Supply Limits Car and Locomotive Increase

Some interesting facts regarding the relation of steel supply to the car and locomotive situation are contained in a letter addressed by C. R. Gray, director of transportation of the Railroad Administration, to Senator E. D. Smith, chairman of the Senate Committee on Interstate Commerce, who has been making a preliminary inquiry for the committee as to what action has been taken by the Railroad Administration to supply the deficiency in motive power and cars for the transportation of coal.

The fundamental need is for motive power, Mr. Gray said, and it is the intention to utilize the maximum capacity of the locomotive plants, both commercial and railroad, to the limit, but the steel supply is the controlling factor and the orders just placed for cars and locomotives would have been greater, particularly in the case of engines, if the steel had been available. The orders will consume all the steel which the War Industries Board could place at the disposal of the railroads.

Mr. Gray estimated that the railroads under peak load are short approximately 4,000 locomotives and from 200,000 to 250,000 freight cars. On April 1 the builders had on hand unfilled orders for 2,127 locomotives, while the 1,025 just ordered make a total of 3,152, and the director general stands ready to place orders for the balance as rapidly as they can be produced.

The unfilled car orders on April 1 amounted to 27,525 and orders have been placed for 100,000, including 50,000 box cars, 45,000 coal cars and 5,000 cars for steel products. The average production of freight cars for American railways in the seven years ended December 31, 1917, was 98,215 annually.

On January 1, 1918, Mr. Gray showed, there were on order 2,448 locomotives. In three months the builders had delivered only 321, due to shortage of material and the construction of locomotives for Russia and for our military railroads in France. In addition, however, the railroads have received 147 Russian locomotives and 105 U. S. A. locomotives which were allotted to them temporarily. The builders estimate that the order for 1,025 locomotives placed this month, together with the locomotives on order for the railroads and for the War Department, will consume their capacity for the balance of the year. On January 1 there were also on order 42,696 freight cars, of which 15,171 had been received up to March 31.

Mr. Gray showed also that up to the third week of April the railroads had handled 3,522,919 cars of coal, an increase of 49,638 over the corresponding period of 1917.

Mr. Gray's figures indicate that the lack of sufficient steel is likely to prevent any considerable net addition to the car equipment of the railroads this year, because the addition of 98,000 new cars per year during the past seven years was sufficient only to increase the total of freight cars in service from 2,195,511, in 1911, according to the Interstate Commerce Commission statistics, to 2,342,699 on December 31, 1916. This represents an increase of 148,000 over the number of cars retired during the period. Since 1915 there has been a decrease. On June 30 of that year there were 2,356,338 freight cars. On June 30, 1916, 2,326,987 were reported and on December 31, 1916, there were 2,342,699. The 1917 figures showing the number of cars in service are not yet available.

The number of locomotives had increased from 61,327 in 1911 to 64,073 in December 31, 1916. In this case also there was a decrease from 1915 when there were 65,099.

Additions and Betterments

The director general on May 8 issued Circular No. 25, directing the roads to make a report as to additions and betterments, as follows:

"Each carrier shall at once make a report in duplicate, sending one original to the Director of the Division of Capital Expenditures and the other original to the Regional Director, giving full advice as to whether the carrier is proceeding with all practicable expedition to construct and put into operation all additions and betterments on its lines which may have been approved by the Director of the Division of Capital Expenditures, and all equipment which may have been so approved, and which the carrier may be constructing in its own shops.

"If a carrier shall not have commenced any project so approved, or, having commenced it, shall not be prosecuting it vigorously to completion, the carrier shall specify in the above-mentioned report each such project and state fully the reasons why it has not been commenced or why, if commenced, it is not being vigorously prosecuted to completion.

"If a carrier shall not have, on hand or arranged for, the necessary funds to construct and put into operation without delay all the additions and betterments which have been so approved, and if it anticipates that this condition is likely to delay any of such work, the carrier shall in addition make a report at once to the Director of the Division of Finance, stating its financial needs in order to enable it to complete all such work expeditiously."

Car Record Office for Government Freight

The Car Service Section announces, in Circular No. CS—8, the establishment on May 15 of a car record office, by the Car Service Section, at Washington, D. C., for the purpose of recording the movement of carload shipments of United States government freight as follows:

(*a*) Supplies and materials consigned to an officer, depot, warehouse, or port of embarkation, for account of the War Department (Army).

(*b*) Supplies and materials consigned to the Navy Department, to Navy Yards, Naval Stations, or the Marine Corps.

(*c*) Supplies and materials consigned to or for account of the United States Shipping Board, Emergency Fleet Corporation.

(*d*) Supplies and materials consigned to: the United States Treasury Department, the United States Post Office Department, the Bureau of Engraving and Printing, the Department of the Interior, the Public Printer.

Before executing bills of lading for United States government freight, agents must ascertain from shipper the department to which the shipment is consigned, and must plainly indorse the bill of lading accordingly. The waybill must be stamped on both face and back "UNITED STATES GOVERNMENT FREIGHT," in order that such freight may be readily identified.

Agents executing bills of lading for United States gov-

ernment freight designated in paragraph 1 must mail one legible copy of each such bill of lading to Car Record Office, Car Service Section, Washington, D. C., on the date the shipment is receipted for.

Agents at the junction points named in a list of 56 points must mail daily to Car Record Office a report, Form CS—2, covering all carloads of United States government freight, delivered to connecting lines. This report must be made for each 24 hours ending at midnight, and must be completed and deposited in the mail prior to noon of the following day.

It may develop that it will be advisable to have interchange reports mailed direct from other points, in which case supplementary instructions will be issued.

Agents at all junction points of the railroads receiving these instructions must show in the remarks column of their standard interchange report, opposite each car of government freight, "U. S. Govt."

The officer in charge of car records of each railroad receiving these instructions will report daily to Car Record Office all cars of United States government freight delivered to connecting lines at other than the junction points named. Reports rendered each day must include all cars of United States government freight shown on interchange reports received in the office during the previous day. More than one date may be included on one report, but the date of interchange must be shown for each car.

When a carload of United States government freight is transferred, a report of the transfer showing old and new car initials and numbers, must be rendered to Car Record Office by the agent of the delivering line at the first junction point after the transfer has been made.

Destination agents—that is, agents who take the waybills into their accounts—must report daily to Car Record Office arrival of all cars of United States government freight. These reports must be compiled and placed in the mail before noon of each day.

Director General Saves N. Y. C. 1 Per Cent

Director General McAdoo issued the following statement with regard to application of the New York Central for authority to issue $6,000,000 collateral trust notes for six or twelve months for the purpose of paying off certain obligations of the New York Central System maturing this week.

The director general was informed by the company that the best terms on which the money could be obtained at this time would be 7 per cent per annum. The New York Central was advised that a 7 per cent rate on notes of this character was not justified, as such a transaction would have the effect of encouraging high rates for money. The director general thereupon made inquiry of the Central Trust Company of New York as to whether it could arrange to place the $6,000,000 needed by the New York Central for six months at 6 per cent per annum interest, and was promptly informed that the Central Trust Company would gladly provide the funds on the terms suggested.

Interline Waybill Order

C. A. Prouty, director of public service and accounting, has issued the following circular regarding the interpretation of the interline waybilling order:

"Paragraph 3 of General Order 11 provides: 'Waybills for carload freight must move with the cars. Waybills for less carload freight must be moved with the cars when practicable; otherwise so as to reach the transfer point or destination with or in advance of the cars. . . .'

"In order to expedite the moving of meats and packing-house products from Chicago and other points from which these commodities are shipped, the following telegram was addressed to Regional Director Aishton: 'Am advised Car Service Committee at Missouri River and other packing house shipping points decline to move cars without copy bill of lading. Please advise all concerned that they may disregard first sentence paragraph three, General Order 11, on eastbound packers' traffic from Chicago, applying merchandise car practice there outlined to packers' cars, pending further consideration here. See no reason why card waybills cannot be used, mailing waybills to destination or division points as heretofore.'

"The rule announced in this telegram cannot be said to be in conflict with the principles contained in paragraph three of General Order No. 11. It provides that the cars containing meats and packing-house products of a perishable nature may be forwarded in advance of the waybills therefor, and such waybills will be sent forward as quickly as possible so as to catch the cars before their arrival at destination or will reach destination in advance of the cars. Commodities shipped by packing interests other than those named herein and which are not of a perishable nature, shall be waybilled as provided in General Order No. 11."

Regional Director Confers With Western Short Lines

Over 200 representatives of western short lines convened at the Hotel Muehlebach, Kansas City, on May 8, for the purpose of discussing the relations between the Railroad Administration and short line roads. The meeting was opened with the election of D. M. Swobe, president of the Western Association of short line Railroads, as chairman of the conference, and C. M. Oddie, secretary of that organization, as secretary of the meeting. R. H. Aishton, regional director of western railroads, was present, with a number of the members of his staff, and explained in detail why some short lines will be relinquished from government control while others will be retained. He stated that those lines which will be retained will be operated by the trunk lines with which they connect and intimated that if this is done the officers of the short lines in question will be removed and the short line shops closed. The owners of lines which are taken over by the government will be reimbursed, provided they enter into a particular form of agreement which will be prescribed by the Railroad Administration.

Mr. Aishton's remarks relative to the disposition of short lines which will be retained led to a general discussion of the treatment which should be accorded to those lines which will pass out of government control. In general, the following policy was recommended by the meeting:

1. Short lines not retained under government control should be affiliated as a class with the government and conducted under a uniform policy, which will insure them a proper division of all through rates and, in the event of any advance in rates on the trunk lines, a proportionate share of the increased revenue.
2. The non-controlled lines should receive their fair share of equipment in car distribution and should not be forced to pay excessive car rentals.
3. The prices for supplies and equipment paid by the controlled roads through their regional purchasing agents should also apply to the non-controlled roads.
4. Non-controlled companies should receive fair treatment with respect to routing over their lines.
5. Agreements should be made by all short lines to accept all priority orders governing freight and passenger traffic which are promulgated by the Railroad Administration.

Those members of Mr. Aishton's staff who attended the conference were M. J. Gormley, operating assistant to the regional director; Ralph Budd, assistant in charge of capital expenditures, and J. G. Woodworth, traffic assistant.

Developments in Western Railroad Region

AMONG RECENT CIRCULARS issued by R. H. Aishton, regional director of western railroads at Chicago, are the following:

Routing of Freight by Shippers

Circular No. 101, dated May 7, gives detailed instructions on the routing of freight: Paragraph 4 of the director general's Order No. 1 provides that the designation of routes by shippers is to be disregarded when speed and efficiency of transportation service may be thus promoted. To prevent misunderstandings and to observe uniformity in applying this rule, the following rules should be observed:

1.—A rate, charge or privilege covered by tariff properly published and filed cannot be embargoed or canceled except by correction of the tariff in the manner required by law.

2.—A route covered by tariff properly published and filed may for sufficient reasons be temporarily embargoed, but cannot be discontinued except by correction of the tariff in the manner required by law.

3.—Where a shipper specifies a route to which under the tariffs transit privileges and terminal rights apply, when such route is not under embargo, the transit privileges and terminal rights must be protected without additional cost to the shipper should his routing be disregarded by the railroads for efficiency reasons.

4.—When traffic is forwarded by the railroads for efficiency reasons via a route to which a higher rate applies than over the route specified by shipper, the rate via the shipper's route must not be exceeded as a charge for the movement over the substituted route.

It is the intent of Paragraph 4 of Order No. 1 that while the railroads may in the interest of efficiency make use of the most desirable routes without regard to the directions of the shippers, the rates, charges and privileges as published and filed in tariffs of the carriers will not be denied, and the Interstate Commerce Commission has issued an order authorizing the adjustment of charges in accordance with this principle. It is desired that all reasonable and economical routes shall be properly published so that they may be available when needed, and if in an emergency a route not provided by tariff is used such route should be covered by tariff immediately, unless it is of such a character as not to warrant its permanency. Nothing in these instructions shall be considered as giving to shippers the right to rates, charges or privileges applying to routes which may be embargoed at the time of shipment.

Authority for Expenditures

Circular No. 105, dated May 11, reads as follows: A number of the railroads are submitting D. C. E. forms 3 and 4 with the word "blank" or "nothing to report" typed thereon. Please do not submit D. C. E. forms 3 and 4—requests for authorities—unless there is something to report or authority is requested in connection with some work chargeable to capital account.

Reservations—Sleeping, Parlor Car, Etc.

Circular No. 102, dated May 8, sets forth the following rules governing sleeping car reservations, etc.:

1.—Railroad agents or representatives will not pay for telegraph or telephone messages covering sleeping, parlor car or steamer reservations. Passengers desiring such reservations made for them by railroad representatives will be required to pay the established charges for the necessary telegraph or telephone service in both directions.

2.—Assignments of space to offices located off the line of sleeping and parlor car runs must not be made.

3.—Agents at intermediate points on sleeping or parlor car runs, at which space is not available, or to which space is not assigned for the sale of tickets, may make use of railroad wires, without charge to passengers, in arranging for accommodations to be taken at such points.

Shipments of Government Lumber

Circular No. 95, dated April 30, sets forth the details of a plan for the consolidation of shipments of government lumber from Pacific coast territory, effective May 6. According to the plan as outlined, shipments will be consolidated, kept intact, and given continuous movement from concentrating points in solid trains. Fifteen cars will be considered a minimum number for any one train, to be filled out with other tonnage to rating, provided there is not sufficient tonnage for a full train of government lumber. Concentrating points for this lumber are as follows: Great Northern, Delta, Wash.; Northern Pacific, Auburn, Wash.; Chicago, Milwaukee & St. Paul, Cle Elum, Wash.; Oregon-Washington Railroad & Navigation Company, Portland, Ore.

Joint Live Stock Offices

Terminal committees reporting to the regional director of western railroads are working out plans for the consolidation of live stock agencies at Kansas City, Mo.; Omaha, Neb.; St. Louis, Mo., and Chicago. The handling of live stock shipping activities from one large office in these cities will effect a considerable saving in office rentals and, it is believed, will prove advantageous to shippers, in that it will give them a choice of routes which will make for more expeditious car movement. It is probable that the plan will be extended to other cities if local conditions make it appear advisable.

Responsibilities of Railroad Men*

By Robert Quayle

General Superintendent of Motive Power, Chicago & North Western.

"THERE IS A GREAT RESPONSIBILITY attached to railroad men today. I sometime think that we should stop occasionally and consider what our responsibilities are. What can we do that will make for greater efficiency, that will make for success? What will allow us to reduce the man power in our shops, to do work with less men? The man who does this now, will be the man who will stand in the forefront, because he is doing something worth while. When you have a job that you must do you respond to the call and do it. We have a big task now; let us be on the job all the time, so that we can make good at it. We are at war, let me emphasize it, we are at war, and we are just beginning to realize it. We are expecting a great deal of the railroads, but we are not going to expect too much, because railroad men are thoroughly loyal, thoroughly efficient, and will measure up to what is demanded of them. One thing you must do now and that is your level best. This is no time for pessimism, this is a time for optimism. We must cheer everyone with whom we come in contact.

"We must be loyal and give men here and there, even though we are having a hard time. Let us do our part to back up our men, that the stars and stripes may shine with more glory than ever before. Let us do our work with clean hands. Democracy must prevail—democracy will prevail! Let us as a nation do something to lift the world out of the depths it is in, that the world may rise up and call us blessed. But let us not forget those who are close to us. The men in your shops need more than knocking. It has been said that you can't saw wood with a hammer. It is just as certain that you can't lift men with a hammer. We are going to do our part if we help those about us; we are going to do our part by doing our work cheaper and better than ever before. And when the country asks more of us we are going to take another notch in our belt, and march forward, and do the best we can."

*From an address before the Western Railway Club.

Looking North Toward Pier 8. Photo copyrighted in Canada by W. G. MacLaughlin

Salvaging the Railway Facilities at Halifax, N. S.

An Account of the Damage Done by the Disaster of December, 1917, and Work of Restoration

By F. B. Tapley

Assistant Engineer Maintenance of Way, Canadian Government Railways, Moncton, N. B.

THE COLLISION OF THE STEAMERS "Imo" and "Mont Blanc" in the narrows of Halifax harbor, on December 6 last, caused an explosion of the cargo of the "Mont Blanc," which wrecked about one-third of the area of the city and water front, and damaged the railway facilities in the vicinity of Richmond yard and North Street station, and along the water front at Deepwater, which is farther south. The evidence on the ground would lead one to believe that the "Mont Blanc" exploded in the vicinity of Piers 6 and 8, the greatest damage being done there, and extending southwesterly to the North Street station, and northeasterly to Willow Park Junction,—the radius of the greatest force of the explosion extending about 5,000 ft. While there were evidences of the force of the explosion all over the area of the city, the greatest damage was within the radius mentioned.

Extent of the Damage

On Pier 9, which is the most northerly railway pier along the water front, a wooden shed was so badly shaken by the force of the explosion that it collapsed in a heap. The substructure of the pier was not damaged, although with the large amount of wreckage piled on it, it took considerable time to find it out. Pier 8, next down the water-front, was destroyed from the water level up, a portion of the old crib below the water level remaining. It was a wooden pier of crib construction, ballasted with stone. Pier 6, a wooden pile pier, without a shed, was completely blown away, and no trace of it remains to mark the spot where it stood.

At Richmond Yard station, the car repair buildings and cattle pens were blown to atoms, while the switchmen's shanties throughout the yard were so badly wrecked as to be unfit for repair.

The North Street passenger station sustained very heavy damages. The front and back thirds of the train shed roof were blown upward with the blast of the explosion, and then collapsed and fell down inside the brick walls. Thirteen of the roof trusses in the centre of the shed, with the roof boarding, framing and sash on them, remained standing, but were later pulled down for safety. The glass was blown out of all the windows, and the doors out of the casings, but, being vertical, counterweighted, sliding doors, many could be operated afterwards. In the head-house of the station, which is a solid brick structure, the damage was very heavy. Downstairs all the doors, windows and fixtures were blown off. The main partitions stood up under the force of the explosion, but the light wood counters, ticket wickets and similar fixtures were blown down and badly broken. The brick walls were found to be in good condition, except for a few loose bricks next to the roof timbers; these, no doubt, were loosened by the disturbance in the roof.

On the second floor, all doors and windows were blown off, and the plaster partitions bulged and broken. The damage to the third floor was practically the same as on the second floor, and a portion of the roof on the monitor was blown upward. Later, in the heavy storm of Sunday, December 9, this portion of the roof collapsed. The power plant and power house, adjoining the station, suffered broken pipe connections and a wrecked roof, all doors and windows being blown off or broken.

The damage at Deepwater, where the local freight and ocean passenger facilities are situated, was heavy, but fortunately did not put the facilities entirely out of business.

Further down the harbor, at Pier 5, which was abandoned for shipping purposes last summer, the latrines erected for the sanitary convenience of troops last fall were badly shaken up and had to be rebuilt. Pier 4 is a wooden pile pier, with two outside tracks, and a wood shed of the single-deck type. Repairs were underway when the explosion occurred. The pier was unharmed, but the shed was completely wrecked. Pier 3 is a wooden pile pier, with single story wooden shed and four tracks, two outside and two inside of the shed. The pier was not damaged, but the roof trusses on the north half of the shed were all broken and all the doors and windows blown off. The electric wiring fell down onto the floor. The south half of the frame was not damaged.

Old Pier 2, an open wood pile pier with two tracks, was not damaged. New Pier 2 is a passenger pier, built of reinforced concrete pile construction with a slab deck and has a double-deck reinforced concrete shed with four tracks, two outside and two inside the shed. The shed and pier proper were practically undamaged. That it was under heavy stress was evidenced by the condition of the fixtures. The heavy steel doors were all blown off the north side, both upstairs and down, and practically all the glass broken. On the south side of the pier, eight of the large steel doors downstairs were blown off, and a number damaged. The upstairs doors were also damaged, but not to the same extent as on the north side. Some of the north side doors were blown nearly across the shed, and one or two were found wrapped around the concrete columns in the middle row.

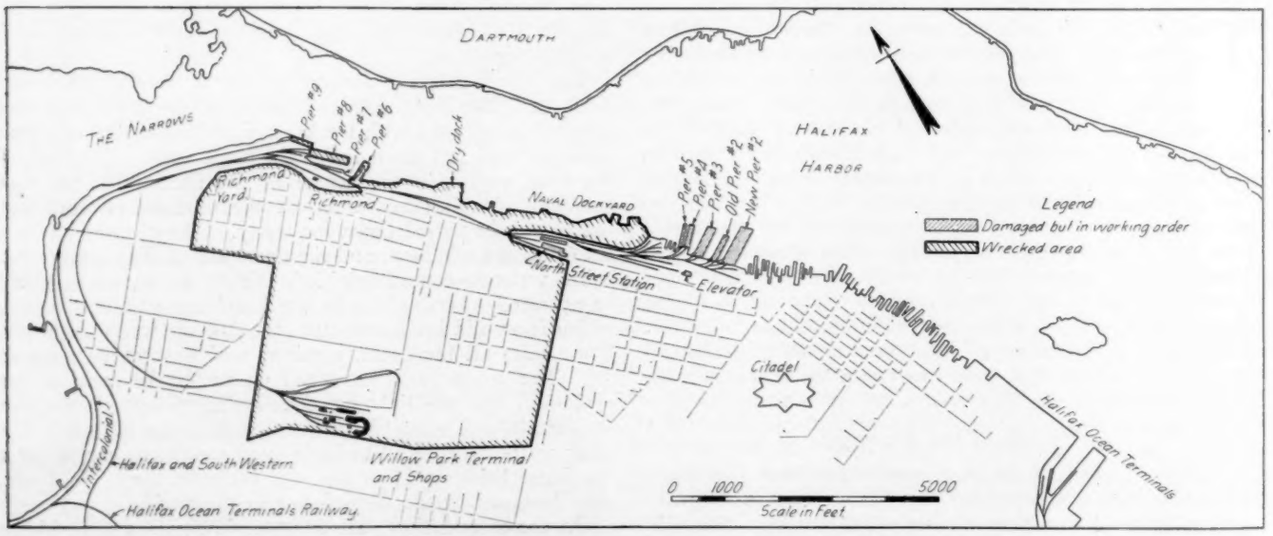
In the military hospital upstairs, the light wood temporary partitions were badly shaken up, and in falling broke some of the steam radiators clear of the pipes, and carried down some of the temporary electric wiring fastened to them. The power plant was not damaged, although the building housing it was shaken up. The glass in this shed was wire glass set in metal frames, and while it was practically all broken, a large proportion of it remained in the sash, affording some protection from the weather, and it did not fly out in the form of fine particles like the plain glass, which caused so many cases of blindness.

The Deepwater local freight shed, a brick structure, situated behind the piers, was not greatly damaged, except for a short section of the roof next to the office portion, which opened up along the ridge for a distance of 60 ft., and the loss of the glass in the office windows and transoms over the freight doors.

The 500,000-bu. grain elevator, which is of wood construction, had the roof over the bins so badly damaged that it had to be rebuilt. All of the windows in the working house and shipping galleries were blown out, and a hole was blown in the northerly side of the working house. This hole blew outward and toward the explosion, showing that it was caused by reduced air pressure outside the building. The power plant was not harmed, and was put under steam on the afternoon of the seventh.

Damage to Freight Cars Near Richmond

At Willow Park, where the engine terminal is located, the damage was quite severe. By looking at the map, it will be seen that Willow Park is situated directly behind Pier 6, in front of which the explosion occurred. It is on top of a hill from which the land slopes down to the harbor. The doors and windows in the car shop, stores, planing mill, oil house and engine house were blown out; the roof of the engine house was badly damaged, and the greater portion of it collapsed. The roofs of the machine shop, boiler house and blacksmith shop were found to be badly shaken up, and had to be rebuilt. These roofs were of concrete, reinforced with expanded metal, and were of poor construction. The reinforcement was badly rusted and the concrete very lean in



Map of a Part of Halifax, Showing the Affected Area

cement. The condition of the roofs was probably a contributing factor to their giving way under the shock of the explosion. The power transmission line from Willow Park to North street and Deepwater, which ran along the city streets, was wrecked, and the power had to be obtained from the Nova Scotia Power Company's plant in the south end of the city. The Willow Park power plant was damaged, but was repaired and put into service in two days.

The telephone train despatching line between North Street station and Rockingham was wrecked, but was repaired, and put into service temporarily on December 9. All automatic signals between North Street station and Willow

How Rails Were Bent at Richmond

Park Junction, a distance of 7,000 ft., were badly damaged, and would not work; they have since been restored. Train operation was carried out without their aid while repairs were being made. The new ocean terminals in the south end of the city were practically unharmed, some slight damage being done to the windows and doors of sheds 23 and 24.

The loss to rolling stock was heavy, consisting of 122 sleeping, dining, commissary, hospital, tourist, first and second class and baggage cars. There were 93 box cars wrecked, and 342 damaged. The passenger cars were immediately shopped at Moncton and Amherst, and the repairs completed, and cars put back into service as quickly as possible.

Restoring Train Service

Although the damage to the railway property was heavy, it was fortunate that the two main tracks leading to the North Street station were intact, as this gave the wrecking cranes a chance to start work immediately. By Saturday noon, two heavy cranes had cleared the tracks to the North Street station, and preparations were made to tear down the standing portion of the train shed roof. At 6 p. m., Saturday, December 8, 1917, the first passenger train was sent out of the North station, and full train service was resumed on Monday the tenth. Meanwhile, trains were run over the main line of the Halifax Ocean Terminals Railway, a belt line which girdles the city to the South End terminals. All passenger and relief trains were handled here, while the work of clearing up the wreckage at the North Street station was progressing. Train despatching was done between the South End terminals and Rockingham yard by city telephone, and trains were re-despatched from there on the regular railway telephone circuit from the despatching office at Truro. The accommodations at the South End terminals were rather crude, and delays were encountered, as the engines hauling trains between there and Rockingham had to be of small size to clear the falsework of structures being erected.

Accommodation was provided for doctors and nurses in sleeping cars heated by locomotives. The office work was carried on in the office building of the Halifax Ocean Terminals' engineering staff. After full train service was resumed out of North Street station on December 10 less delay was encountered. The walls of the North Street station were left standing, and a covered concourse was built next to the head-house to form a covered way for the protection of passengers. The station will not be rebuilt, as the passenger business will be shifted to the South End terminals next summer, plans now being under way for a passenger station and the necessary facilities at that point.

Immediately after word was received of the explosion, wrecking and relief trains were started from Moncton, Truro, Stellarton, and Sydney, and all the men who could be spared were taken along, as it was feared that the loss of life had been heavy, and the railway would be handicapped in handling the traffic which was bound to pour into Halifax as soon as the extent of the damage was known. First estimates were found to be surprisingly accurate, and all the men taken along on the first trains were not sufficient to fill all the gaps in the railway forces, and more men had to be sent for, and an almost entirely new working force recruited from the railway service outside.

The Salvage Work

After the train service was restored, the work of surveys and repairs was at once organized. A diver was sent down to examine all the structures below water level, and carefnl surveys of the damage to all structures above water and on land were made.

The forces working on these surveys were taken from the Halifax Ocean Terminals' staff, the division engineer's staff at Moncton, the resident engineer's at Truro, and the chief engineer's office at Moncton.

An organization was at once made up to handle the work of rehabilitating the railway structures, which was later extended to include the repairs to the Naval dock yard. This consisted of a manager of construction, an architect, and a naval man, assisted by two contracting superintend-

Boat Blown from the Water Onto Pier 9

ents, who acted in a consulting capacity. Under this board there were assembled office and field engineers, draughtsmen, auditors, purchasing agent, storekeeper, material men and commissary men.

The office of manager of construction is held by C. B. Brown, assistant general manager of the Canadian Government Railways, and the execution of the work is under the

direct charge of W. A. Duff, the assistant chief engineer.

The damage to the railway property is estimated as follows:

Structures in Halifax, piers, buildings, tracks, machinery, power, telegraph lines and signals	$751,600
Structures in Dartmouth (across the harbor)	52,700
Rolling stock	178,000
Commissary stores	17,700
Steamer	70,000
Miscellaneous costs, operating department, labor, relief trains, supplies, etc., in cleaning up and relief work	155,000
Total	$1,225,000

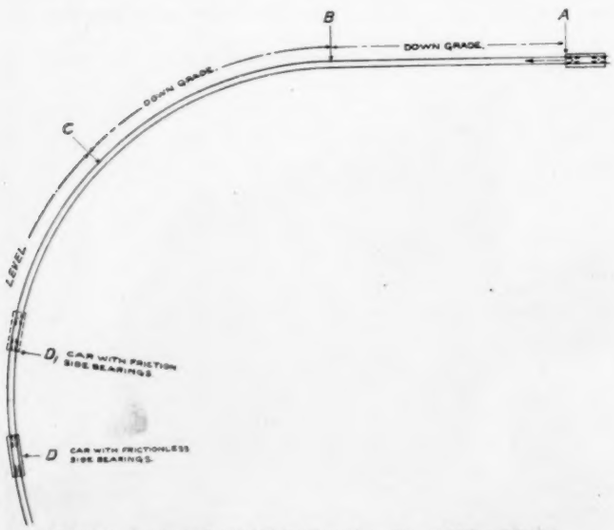
Such warehouse and dock space as was lost in Richmond will be duplicated in restoring it at the south end. Work has been underway since the explosion, and is now practically complete so far as the lost warehouse space is concerned, two warehouses having been erected on the shore end of Pier A. The remainder of the damaged structures have been pretty well restored at this time, some four months after the explosion. Tenders for the South End passenger station have been taken, but the work has not been contracted for to date.

Frictionless Side Bearings and Coal Conservation

By A. M. Engineer

TO DETERMINE THE VALUE of frictionless side bearings in a practical way the Union Railroad recently made a unique test in which no outside factor was permitted to come into play. It was decided to use the same car, the same load and the same curve in all the tests and to use only gravity in starting the car.

An old car, loaded with ore, was taken from the yard. It was equipped with a frictionless side bearing, which the railroad had adopted some years ago as its standard. It



Track Over Which Side Bearing Test Was Made

was taken to Gascola and run over a curved track as indicated in the illustration. The approach to the curve from *A* to *B* was straight and down grade, which permitted the car to accumulate a fixed amount of momentum at the beginning of the curve. The portion *B-C* of the curve was also down grade, while the remainder of the curve and the track from there on was practically level. Points *A* and *B* were marked carefully and the rail from *B* to *D* was measured off and marked every 25 ft., so as to facilitate the measuring afterwards and to eliminate any possibility of error in doing so.

The car was turned loose at the point *A* and after it came to rest at *D*, its position was carefully determined, and as a check, the car was dropped the second time. Then the side bearings were converted into plain bearings, by blocking all the movable parts. This was done within an hour, so that the track and weather conditions remained unchanged. Likewise, the journal box conditions and the journal lubrication were the same. The car was again turned loose twice from the same starting point. This time it came to a standstill sooner, as shown in dotted lines, or 545 ft. from *B*. With the frictionless side bearings it had run 602 ft., hence gained 57 ft., or 10.4 per cent.

Such a saving in track resistance must be appreciated by everyone and as there was no calculation necessary, other than measuring the distances, this test can be repeated at will.

It should be borne in mind that the car was loaded with ore, which means a low center of gravity. Had it been loaded with coal, the relieving influence of the frictionless side bearing would have been still greater. The curve is a gradual one. Had it been shorter, the above percentage would again have been increased; and the further fact that the distance from *B* to *C* was on the down grade instead of on a level, affected the results again very materially in the same direction; so that the percentage measured on the track would be greatly enhanced by compensating for these three items. This was not done, as it was deemed more desirable to have an absolute concrete result, one that could be duplicated at will, instead of a figure obtained by theoretical deductions.

The saving of 10.4 per cent of power on the curves of course means much more tonnage per engine in a train and a saving of coal, which ultimately would mean a conservation of millions of tons. Besides that, it also is evident that there must be a great saving in wheel flanges and rails and a decided reduction of wheel flange pressure against the rail, thus keeping the wheel from climbing the rail and causing derailments.

PROPOSED INCREASE IN ARGENTINE RAILROAD RATES.—The leading railroads serving the Rosario district have given notice of a further increase in freight rates of 10 per cent, to take effect May 1, 1918. An increase of 10 per cent was put into effect October 1, 1915, and an increase of 22 per cent was made effective October 20, 1917. With the increase now contemplated the rates would be approximately 47.6 per cent higher than they were three years ago. Rising cost of material and labor is given as the reason for the proposal. A protest has been made by the Rosario Chamber of Commerce, and other opposition is expected. Current railway receipts are showing very substantial increases as compared with the last year.—*Commerce Reports.*

FUEL OIL CONSUMPTION BY RAILROADS IN 1917.—The Geological Survey authorizes the following: The immense increase in railroad traffic due to the active participation of the United States in the war increased correspondingly the quantity of petroleum and of petroleum distillates consumed as locomotive fuel in 1917, despite their mounting cost and growing scarcity. Statistics compiled under the supervision of J. D. Northrop, of the United States Geological Survey, from reports submitted by all railroad companies that operated oil-burning locomotives in the United States, show that the quantity of fuel oil consumed by them in 1917 was 45,707,082 barrels, a gain of 3,580,665 barrels, or 8.5 per cent over 1916, and a larger consumption than in any other year. The total distance covered by oil-burning engines in 1917 was 146,997,144 miles, and the average distance covered per barrel of fuel consumed was 3.2 miles. Oil-burning locomotives were operated in 1917 over 32,431 miles of track in 21 states.

The Trade Acceptance in the Supply Field

Would the Use of Acceptances Help the Railways Catch Up on Their Present Overdue Accounts?

A DETAILED DISCUSSION of the use of the trade acceptance in the railway supply field naturally divides itself into two parts; (1) its use in sales to railway supply companies, and (2) in sales to railways.

There are many essential differences between the financing of sales to supply companies and those to railways.

The supply companies buy goods for resale to the railways or to other supply companies or for manufacture into goods which are so sold. They sell on credit and are considered on the whole good paying customers, the discounting of bills for cash, where such discounts are allowed, being the rule rather than the exception.

The railways, on the other hand, buy goods only for consumption, and there is no resale. They sell their only commodity—transportation—for spot cash, but despite the fact that they operate what has been termed the greatest cash business in the world, they are proverbially poor payers. They buy on terms such as 30 days net cash, but pay not at the expiration of 30 days, but in 60, 90, 120, 150 days. In fact, the situation in the railway field today is causing no small anxiety to the supply companies, conditions having actually gotten considerably worse since the government took over control of the railroads.

The operations of supply companies seem, on the whole, to lend themselves in great degree to the use of the trade acceptance. A few companies are already planning to put the trade acceptance into use in their dealings with fellow manufacturing companies.

The use of the trade acceptance in the railway field is at present largely for the government, through the Railroad Administration, to determine. Nevertheless, something must be done, and done at once, to secure more prompt payment of invoices of supplies sold to railways. It is essentially wrong that the railways should sell for cash and pay for goods on invoices that are months overdue. Perhaps, the trade acceptance may prove the remedy.

As was noted in a previous article on this subject in the *Railway Age* of March 1, page 463, the trade acceptance is defined by the Federal Reserve Board in regulation A, series of 1917, as a draft or bill of exchange drawn by the seller on the purchaser. of goods sold, and accepted by such purchaser; and a bill of exchange, within the meaning of this regulation, is defined as an unconditional order in writing, addressed by one person to another other than a banker, signed by the person giving it requiring the person to whom it is addressed to pay, in the United States, at a fixed or determinable future time, a sum certain in dollars to the order of a specified person.

The trade acceptance is meant primarily to cover sales of goods by a manufacturer to a jobber or by a jobber to a retailer who expects to sell the goods and realize upon them before the 60 or 90 day maturity of the acceptance. Its idea, in any case, is to change the open book account, with its indefinite terms of payment, to a definite obligation, and with definite maturity. No hindrance, whatever, is offered to the merchant who wishes to discount for cash, as it is the rule to allow the seller to pay in time to take his discount or to give his trade acceptance instead.

The sale of goods to railway supply companies does not partake absolutely of the nature of a sale to a jobber or retailer, but there are many points of similarity. The producer of raw materials or the specialty house sells to the railway supply firm, which in turn deals with the railways directly, or uses these raw materials or specialties in the manufacture of goods which he then sells. The supply houses, as a rule, are in a position to discount their bills, but, of course, this by the very nature of things, cannot be invariable. This is where the trade acceptance comes in. It helps finance the transaction between the time the goods are sold and the time their manufacture into other goods is completed and they are sold as a finished product to the next party in line. Thus the raw material producer, to take the first firm in the entire transaction, on selling his goods will draw a trade acceptance on the house to which he sells. This trade acceptance, the buyer will accept and the original producer can consider the open book account closed. At the end of 90 days the trade acceptance is paid. In the meantime, the producer may need funds. He will take the trade acceptance to his bank, discount it as he would a note, and he will find it very much to his advantage to do so should the necessity arise. He can usually borrow only to the extent of 50 per cent of his open book accounts. On the trade acceptance he can realize on 100 per cent, and owing to the favor with which the Federal Reserve Board looks on the trade acceptance, he can also secure his money at a lower discount.

In the meantime, the buyer will have sold the goods or have fabricated them into a finished or semi-finished product which he in turn has sold, possibly with the discount for cash, or on a trade acceptance. The second trade acceptance, in such a case, would, if necessary, be available to pay for the first. As the first acceptance comes due, our original buyer, now a seller, will take this acceptance, the second in this transaction, to his bank, discount it and funds will be available at the bank for payment of the first acceptance. This, of course, is more or less of an ideal case, but it is not impossible. At any rate, it will be seen how the trade acceptance will help carry the accounts even if conditions may not let it carry them entirely.

The advantage of having, instead of an open book account with its indefinite term of maturity, an obligation with a definite term and in a security which can be realized upon at the bank at any time on most favorable terms is evident.

In these times when prices are so high, when deliveries are so poor that big inventories of material are an absolute necessity and when conservation of men, materials and money is the order of the day, the advantages of the trade acceptance where it can be used are immeasurable. The men behind the trade acceptance include many of the country's leading bankers and business men. These two facts make certain the prophecies of the trade acceptance enthusiasts that it is only a question of time when the acceptance idea will be in general use. The railway supply industry can certainly be put down as one of those fields in which the trade acceptance, once its advantages are understood and realized, will meet with increasing favor.

Railway Purchases

The manner in which the railways have been making payments on invoices from railway supply companies during the past few months is becoming of serious moment to the railway supply field. Bills that should have been paid in 30 days are running over to 90, 120, 150 and even 180 days, and under government control, payments instead of becom-

ing more prompt have been becoming slower and slower. This condition is beginning to prove serious to many supply companies and everybody is hoping that remedies will be taken and taken at once to overcome a situation that is manifestly wrong and unfair.

No supplyman will read into the foregoing, it is hoped, a supposition that the railways have been noted for their prompt payment of invoices in the past. Some roads have paid their bills promptly, but others, including many of excellent financial standing, have actually had to be importuned to make some kind of reasonably quick payment. There are, of course, many reasons why payments might be delayed to some extent—delay in receiving the goods, the necessity of carefully checking the shipment and in reporting its receipt complete and in good order, as well as the complexities of putting vouchers for payment through a large and busy organization. But the fact that some roads have paid in reasonably quick time shows that others should be able to do the same. It certainly is not right in the very nature of things that a big railway receiving spot cash for everything it sells, and particularly a railway company with a good balance of cash in its treasury, should make the supply companies finance its purchases over an unreasonable length of time.

Many remedies are being suggested—among them the trade acceptance. Is the trade acceptance a possible solution and is its introduction in railway purchases a likely event?

The introduction of the trade acceptance into the railway field today depends almost entirely upon the Railroad Administration. Mr. McAdoo has not expressed himself as yet on the trade acceptance, but that is only because, with his many other activities, he has not had opportunity to pass upon its merits. It should always be borne in mind that Mr. McAdoo is a member ex-officio of the Federal Reserve Board, and that both the board and the law which created it are decidedly favorable to the use of trade acceptances.

There are many objections to the introduction of the trade acceptance in the railway field and much hard work will be required to overcome them. One of these objections is the competition in the supply field. If one company alone in a particular branch of the field should begin asking for acceptances from the railway customers, it would find that it had uphill work. The railways, presuming that they were not particularly enthusiastic over the idea, could say that its competitors were not asking for acceptances and declare that if acceptances were necessary in doing business with that company they might prefer to trade elsewhere. But it should in all fairness be shown that the railways might be converted to the idea of using acceptances and that if a few big manufacturers or a group of manufacturers in a similar line could work together, the idea might easily be put over.

Another objection lies in the fact that, on the whole, the railway supply companies are large, well-backed financially, and do not need the advantages that go with the trade acceptance. The argument is backed by the fact that many supply companies do not allow discounts for cash payments and that even when discounts are allowed they are proportionately small. It is quite different from the hardware trade, that is to say, where discounts of 2 per cent for cash payment in 10 days are a common rule. This is a valid argument—not, however, against the use of the trade acceptance but against taking the efforts that would be required in extending its use. Conditions of the present day, however, emphasize features that may not have been considered so important in times past, particular reference being made to the unusual need for available funds and to the necessity, because of uncertain deliveries, of holding unusually large stocks of material to ensure steady production. The use of the trade acceptance should help immeasurably in financing these inventories, and the fact that the trade acceptance may be converted into cash at a favorable discount at any time is an advantage that is not to be despised.

The introduction of the trade acceptance in the railway field meets with another objection in that the purchases of a railroad include a staggering total of transactions and that to enter and keep track of trade acceptances would be a tremendous task. In view of the fact that acceptances might be given for monthly accounts and that adjustments could easily be made if necessary, this does not seem a real obstacle. Those who are already using trade acceptances say, in fact, that by their use they save work rather than create more of it for their accounting forces to handle.

No stock need be taken in the plea that for the railways to catch up on their payments from 150 to 180 days to the 60 or 90 days preferred for trade acceptances would necessitate large sums of money. The railways have got to catch up on these accounts somehow and the trade acceptance may be just the thing that will enable them to do it. It should be further noted that trade acceptances can be made out for any maturity, 60, 90, 120 days, or any other term—60 or 90 days is preferred because the Federal Reserve Board will only discount acceptances within 90 days of their maturity. It is also patent that no concern, especially one selling for cash, buying on a 30-day term, should feel justified in taking three, four or five times that term.

How Trade Acceptance Might Be Used

In considering how the trade acceptance might be used in the railway field let us take a hypothetical case in which a company sells to a railway a consignment of sizable value. When the goods are shipped the supply company will draw on the railway a trade acceptance with maturity of 60 or 90 days. This the railway will accept, making it payable at its bank, and return to the seller of the goods. The seller as has been noted above, may hold the acceptance or he may discount it at his bank, realizing on his sale in such case not in 90, 120, or so days, from the date of his invoice, but immediately. By the end of the 60 or 90 days—that is by the time of maturity—the railway will have received the goods, will have been able to check them and pass the vouchers, so that when payment of the acceptance is made by the railway's bank, the transaction will be entirely completed.

The large consignment of this kind would undoubtedly prove the ideal one for the use of the trade acceptance. It could also be used, however, in the case of monthly accounts, covering several sales of smaller amount.

In view of the foregoing, the advocates of the trade acceptance feel it safe to say that the trade acceptance could be used to good advantage in railway purchases. There is good reason to believe, they add, that the objections to its use represent the difficulties of introduction rather than possible hindrances to its use after introduction.

The use of the trade acceptance would certainly put railway purchases on a firmer basis, substituting, as it would, definite obligations with definite terms of maturity for open book accounts with most indefinite terms. It would help the supply field by giving it a considerable amount of liquid assets rather than the open book accounts. Liquid assets at this time particularly are one of the things most to be desired in business, and in the supply field they would prove of special value to assist in the financing of large stocks of materials which must be kept on hand to insure continued and steady production.

What benefits the supply field will indirectly benefit its railway purchasers. The matter of continued production may be taken as a leading example, for to a railway now, deliveries of equipment, appliances or material are more to be desired than fine gold.

There is no doubt, despite all the arguments for or against

the use of the trade acceptance in railway purchases, that its introduction is going to take time and is going to be uphill work. Government control, in itself, adds another complication, and, as has been noted, the question today is almost entirely up to the Railroad Administration and to Mr. McAdoo himself.

Something must be done and done immediately, however, to get out of the slough of despond into which the payments of railway bills has fallen. Some say that one of the reasons is that the government has been so slow in paying its transportation bills to railways. Whatever the reason may be, it is a fact that the supply companies are becoming hard pressed for cash by reason of having to finance railway purchases over such unusual lengths of time. If conditions go on, as they are going now, for the railways to catch up to a reasonable basis of payment will become more and more difficult. No doubt, however, the Railroad Administration will shortly be able to remedy present conditions.

Report of the Railroad Wage Commission

Increases Amounting to $288,000,000 to Be Added to Increases of $306,000,000 Made By Railroads

THE SALIENT FEATURES of the report of the Railroad Wage Commission to Director General McAdoo, recommending increases estimated to aggregate $300,000,000 a year in the wages of all railway employees receiving less than $250 a month, including officers whose salaries are less than that amount, were published in last week's issue. The report itself, including appendices and statistical tables, makes a book of 150 pages comprising a comprehensive statement of the railway wage situation and detailed explanations of the application of the scale of increases to various classes of employment. An abstract of the main report, as signed by the commissioners, Franklin K. Lane, C. C. McChord, J. Harry Covington and William R. Willcox, is as follows:

To make an investigation of the wages and hours of the more than 2,000,000 railroad workers now in the employ of this government has been a matter of engrossing interest. To ask of a man, "What wages should you in justice receive?" is to ask perhaps the profoundest of all human questions. He must go into the whole involved problem of his relationship with his fellows, and to answer the question aright he must in the end come to a judgment which will be nothing less than a determination of what policy or plan of wage adjustment will make for the permanent well-being of the state.

We have searched for no such ultimate answer, if there can be one. But our investigation sought to reveal the insistent problems that confronted these workers, and such recommendations as we make are the practical answers to an immediate and direct question: What does fair dealing at this time require shall be done for these people who are rendering an essential service to the nation in the practical conduct of this industry? The existing state of war prohibits anything approximating a determination of ideal conditions. The exceptional call that has been made upon the railroads, and upon practically all other forms of industry in the country, since the United States entered the war over a year ago, has created an abnormal demand for labor.

As a result of the war, the prices of the necessities of life have been mounting to unheard of levels. The railroads, with the pressure upon them for greatly increased transportation facilities, have been confronted with the problem of asking increased exertion on the part of labor at a time of extreme competitive labor demand and at a time when the purchasing power of the pay is shockingly small. The commission has consequently considered the railroad wage problem with the idea that the government must courageously direct its attention toward the maintenance of rates of wages for the railroad employees which are still adequate for those who, as they patriotically labor, recognize that the war has brought to us all the necessity for sacrifice.

WASHINGTON, D. C.

Requests for $1,000,000,000 a Year

The requests which have come to us for wage increases would, if fully granted, involve an additional outlay in wages of somewhat over $1,000,000,000 per year in excess of the wage fund of last year, which exceeded two billions. Some asked for an increase of 100 per cent in their pay, and from this they graduated downward to 10 per cent. None were satisfied with their present wages.

If we assume that this total sum should be given, the problem would at once arise as to its distribution. Quite evidently the need or the desert of each class of labor is not to be measured by its demands. The bolder should not be given all they ask merely for their boldness, while the more modest are insufficiently rewarded for the service they render because of their modesty. Some had evidently thought out their claims with particular respect to their power to compel concessions, while others based their demands upon the exceptional character of the services given, the long experience, and the training or character required. Still others found this a proper time to put forward claims which they felt were but a slender part of what justice would award were the whole scheme of wage making to be taken up afresh under a new order of things.

To reclassify the many hundreds of employments in which the 2,000,000 railroad workers engage would be a task calling for more time, skill, insight, and knowledge than we possess. At the outset, it was seen that there were grave inequalities in the rates of wages paid. But who should say what relationship each class of employees should bear to the other?

In the world of economics this situation has been met by the simple application of supply and demand, which is in turn now varied, affected, and modified by those limitaticns arising out of the artificial, but necessary and historic, methods of collective bargaining.

Lower Grades Deserve Greater Increase

These forces have classified employments. In the growth of the railroads there has consequently been evolved no other plan for such classification, and no scientific relationship between the wages paid. The proposal that a new classification should be attempted is one which, to say the least, may not be accepted now. Nevertheless, there stands out one dominating fact, recognized by railroad workers as well as by railroad officials—a conclusion compelled by that large sense of equity which governs where logical processes fails—that the lower grades of railroad employment, those in which the supply of labor has been less restricted, and where organization has been difficult, if not impossible, deserve wage increases out of proportion to the increases for those in superior grades.

Should there be any increase in wages to these men in the railroad service? The railroads themselves have for the past two years been answering this question by yielding, some with a wise prevision, and others too slowly for their own good, to the requests of their employees. It took neither tables nor charts nor briefs to make evident that, if the roads were to hold those men they had, concession must be made to the imperious demand of rising prices for the staples of living.

$350,000,000 Increase in Two Years

Furthermore, an unprecedented call had come for men of certain trades in connection with the new industries that had been created by the war in Europe. To meet this competition the roads had advanced wages by slow steps at first, and later more rapidly. It is hardly realized that the roads themselves have in two years, 1916 and 1917, increased wages approximately $350,000,000 per year, if applied to the present number of their employees.

But these advances were not in any way uniform, either as to employments or as to amounts or as to roads. The situation had been dealt with as pressure made necessary, and naturally those who, by organization or through force of competition, could exert most pressure fared best. Things came to a head just before the government took over the railroads. Another three months of private management and we would have seen much more extensive concessions in wages, or there would have followed an unfortunate series of labor disturbances. The government, therefore, has now to meet what would have come about in the natural course.

Government's Distinctive Position

The government now enjoys this position of distinction—it is not yielding to threats; it is not compelled to a course by fear of any unpatriotic outburst; it is not making concessions to avoid disaster. There has been no hint that such a policy would be pursued by those who have it within their power. By what amount have the railroad workers been disadvantaged by reason of the war and how may that disadvantage be overcome with the largest degree of equity, assuming that, in common with all who do not wish to exploit the opportunities which the war affords, these workers can not have and will not expect a full meeting of the entire burden?

The course of first suggestion is to allow a uniform increase of so many dollars per month to each worker. This is the policy England has pursued. It has the advantage of simplicity; but to our minds it fails primarily in drawing the distinction between those whose need is greatest and those who have largest leeway for sacrifice. To make a uniform wage increase of, say, $20 per month, would increase the railroad budget by nearly $500,000,000 a year. It would be a boon to many whose wages are low, but in its uniformity it would fail to adapt itself to the varying needs of those whom it is intended to serve.

We have had a most exhaustive study made of the cost of living today as contrasted with the cost of living in the latter part of 1915, when by the reaction of the European war the American people first felt keenly the increase in the burdens of life and the need for higher wages. And to our minds it conclusively establishes two things, (1) that the cost of living has increased disproportionately among those of small incomes, and (2) that there is a point up to which it is essential that the full increased cost shall be allowed as a wage increase, while from this point on the increase may be gradually diminished.

This study of the cost of living was not made from paper statistics exclusively, by the gathering of prices and comparisons of theoretical budgets. It was in no inconsiderable part an actual study from life, one of the most interesting and valuable groups of figures having been gathered by the newspapers of the country, by interviews with those of the working class, and the inspection of their simple books of accounts. Roughly, it may be said that the man who received $85 a month on January 1, 1916, now needs 40 per cent additional to his wage to give him the same living that he had then. Below that wage a larger percentage must be allowed, because the opportunity for substitution and other methods of thrift decline almost to a vanishing point; while above that wage a growing proportion of the increase will go to those things essential to cultured life, but nonessential to actual living.

Increase to Meet Living Cost

In fairness, therefore, a sufficient increase should be given to maintain that standard of living which had obtained in the prewar period, when confessedly prices and wages were both low. And upon those who can best afford to sacrifice should be cast the greater burden.

Another argument that is compelling as against the uniform increase in existing wages is the unalterable fact that to give an equal amount, now, to all, would be giving to some a double increase, that which they had received from the railroads during the last two years, and that which the government might award. For not all of the railroads made increases to the same classes, and no two made awards in the same percentages, even within the same groups of employments.

Average Railroad Wages

It has been a somewhat popular impression that railroad employees were among the most highly paid workers. But figures gathered from the railroads disposed of this belief. Fifty-one per cent of all employees during December, 1917, received $75 per month or less; and 80 per cent received $100 per month or less. Even among the locomotive engineers, commonly spoken of as highly paid, a preponderating number receive less than $170 per month, and this compensation they have attained by the most compact and complete organization, handled with a full appreciation of all strategic values. Between the grades receiving from $150 to $250 per month, there is included less than 3 per cent of all the employees (excluding officials) and these aggregate less than 60,000 men out of a grand total of 2,000,000.

The greatest number of employees on all the roads fall into the class receiving between $60 and $65 per month, 181,693, while within the range of the next $10 in monthly salary there is a total of 312,761 persons. In December, 1917, there were 111,477 clerks receiving annual pay of $900 or less. In 1917 the average pay of this class was but $56.77 per month. There were 270,855 section men whose average pay as a class was $50.31 per month; 121,000 other unskilled laborers, whose average pay was $58.25 per month; 130,075 station service employees, whose average pay was $58.57 per month; 75,325 road freight brakemen and flagmen, whose average pay was $100.17 per month; and 16,465 road passenger brakemen and flagmen, whose average pay was $91.10 per month.

These, it is to be noted, are not prewar figures; they represent conditions after a year of war and two years of rising prices. And each dollar now represents in its power to purchase a place in which to live, food to eat, and clothing to wear, but 71 cents as against the 100 cents of January 1, 1916. That there has been such steadfast loyalty to the railroads, and so slight a disposition to use the lever of their necessity and their opportunity to compel, by ruthless action, an increase of wages, is not without significance and should not be passed without public recognition.

With the various conditions which have been detailed all in mind, the commission has reached the conclusion that the fairest method of dealing with the problem of wage increases is to award increases on the following scale:

THE SCALE RECOMMENDED

1 To the monthly rate of pay of men receiving in December, 1915, the amounts named in this column	2 Add the per cent named in this column	3 Equivalent to amount named in this column	4 Making new rate per month as shown in this column
Under $46.00	.....	$20.00	.....
$46.01 to 47.00	43.00	20.21	$67.21
47.01 to 48.00	43.00	20.64	68.64
48.01 to 49.00	43.00	21.07	70.07
49.01 to 50.00	43.00	21.50	71.50
50.01 to 51.00	42.35	21.60	72.60
51.01 to 52.00	41.73	21.70	73.70
52.01 to 53.00	41.00	21.73	74.73
53.01 to 54.00	41.00	22.14	76.14
54.01 to 55.00	41.00	22.55	77.55
55.01 to 56.00	41.00	22.96	78.96
56.01 to 57.00	41.00	23.27	80.37
57.01 to 58.00	41.00	23.78	81.78
58.01 to 59.00	41.00	24.19	83.19
59.01 to 60.00	41.00	24.60	84.60
60.01 to 61.00	41.00	25.01	86.01
61.01 to 62.00	41.00	25.42	87.42
62.01 to 63.00	41.00	25.83	88.83
63.01 to 64.00	41.00	26.24	90.24
64.01 to 65.00	41.00	26.65	91.65
65.01 to 66.00	41.00	27.06	93.06
66.01 to 67.00	41.00	27.47	94.47
67.01 to 68.00	41.00	27.88	95.88
68.01 to 69.00	41.00	28.29	97.29
69.01 to 70.00	41.00	28.70	98.70
70.01 to 71.00	41.00	29.11	100.11
71.01 to 72.00	41.00	29.52	101.52
72.01 to 73.00	41.00	29.93	102.93
73.01 to 74.00	41.00	30.34	104.34
74.01 to 75.00	41.00	30.75	105.75
75.01 to 76.00	41.00	31.16	107.16
76.01 to 77.00	41.00	31.57	108.57
77.01 to 78.00	41.00	31.98	109.98
78.01 to 79.00	41.00	32.39	111.39
79.01 to 80.00	40.87	32.70	112.70
80.01 to 81.00	40.44	32.75	113.75
81.01 to 82.00	40.00	32.80	114.80
82.01 to 83.00	40.00	33.20	116.20
83.01 to 84.00	40.00	33.60	117.60
84.01 to 85.00	40.00	34.00	119.00
85.01 to 86.00	39.36	33.85	119.85
86.01 to 87.00	38.74	33.70	120.70
87.01 to 88.00	38.13	33.55	121.55
88.01 to 89.00	37.53	33.40	122.40
89.01 to 90.00	36.95	33.25	123.25
90.01 to 91.00	36.38	33.10	124.10
91.01 to 92.00	35.82	32.95	124.95
92.01 to 93.00	35.27	32.80	125.80
93.01 to 94.00	34.74	32.65	126.65
94.01 to 95.00	34.22	32.50	127.50
95.01 to 96.00	33.70	32.35	128.35
96.01 to 97.00	33.20	32.20	129.20
97.01 to 98.00	32.71	32.05	130.05
98.01 to 99.00	32.23	31.90	130.90
99.01 to 100.00	31.75	31.75	131.75
100.01 to 101.00	31.29	31.60	132.60
101.01 to 102.00	30.84	31.45	133.45
102.01 to 103.00	30.39	31.30	134.30
103.01 to 104.00	29.96	31.15	135.15
104.01 to 105.00	29.53	31.00	136.00
105.01 to 106.00	29.11	30.85	136.85
106.01 to 107.00	28.70	30.70	137.70
107.01 to 108.00	28.29	30.55	138.55
108.01 to 109.00	27.89	30.40	139.40
109.01 to 110.00	27.50	30.25	140.25
110.01 to 111.00	27.12	30.10	141.10
111.01 to 112.00	26.74	29.95	141.95
112.01 to 113.00	26.38	29.80	142.80
113.01 to 114.00	26.01	29.65	143.65
114.01 to 115.00	25.66	29.50	144.50
115.01 to 116.00	25.31	29.35	145.35
116.01 to 117.00	24.96	29.20	146.20
117.01 to 118.00	24.62	29.05	147.05
118.01 to 119.00	24.29	28.90	147.90
119.01 to 120.00	23.96	28.75	148.75
120.01 to 121.00	23.64	28.60	149.60
121.01 to 122.00	23.32	28.45	150.45
122.01 to 123.00	23.01	28.30	151.30
123.01 to 124.00	22.70	28.15	152.15
124.01 to 125.00	22.40	28.00	153.00
125.01 to 126.00	22.11	27.85	153.85
126.01 to 127.00	21.81	27.70	154.70
127.01 to 128.00	21.53	27.55	155.55
128.01 to 129.00	21.24	27.40	156.40
129.01 to 130.00	20.96	27.25	157.25
130.01 to 131.00	20.69	27.10	158.10
131.01 to 132.00	20.42	26.95	158.95
132.01 to 133.00	20.15	26.80	159.80
133.01 to 134.00	19.89	26.65	160.65
134.01 to 135.00	19.63	26.50	161.50
135.01 to 136.00	19.38	26.35	162.35
136.01 to 137.00	19.13	26.20	163.20
137.01 to 138.00	18.88	26.05	164.05
138.01 to 139.00	18.64	25.90	164.90
139.01 to 140.00	18.39	25.75	165.75
140.01 to 141.00	18.16	25.60	166.60
141.01 to 142.00	17.92	25.45	167.45
142.01 to 143.00	17.69	25.30	168.30
143.01 to 144.00	17.47	25.15	169.15
144.01 to 145.00	17.24	25.00	170.00
145.01 to 146.00	17.02	24.85	170.85
146.01 to 147.00	16.80	24.70	171.70
147.01 to 148.00	16.59	24.55	172.55
148.01 to 149.00	16.38	24.40	173.40
149.01 to 150.00	16.17	24.25	174.25
150.01 to 151.00	15.96	24.10	175.10
151.01 to 152.00	15.76	23.95	175.95
152.01 to 153.00	15.56	23.80	176.80
153.01 to 154.00	15.36	23.65	177.65
154.01 to 155.00	15.16	23.50	178.50
155.01 to 156.00	14.97	23.35	179.35
156.01 to 157.00	14.78	23.20	180.20
157.01 to 158.00	14.59	23.05	181.05
158.01 to 159.00	14.40	22.90	181.90
159.01 to 160.00	14.22	22.75	182.75
160.01 to 161.00	14.04	22.60	183.60
161.01 to 162.00	13.86	22.45	184.45
162.01 to 163.00	13.68	22.30	185.30
163.01 to 164.00	13.51	22.15	186.15
164.01 to 165.00	13.33	22.00	187.00
165.01 to 166.00	13.16	21.85	187.85
166.01 to 167.00	13.00	21.70	188.70
167.01 to 168.00	12.83	21.55	189.55
168.01 to 169.00	12.68	21.40	190.40
169.01 to 170.00	12.50	21.25	191.25
170.01 to 171.00	12.34	21.10	192.10
171.01 to 172.00	12.18	20.95	192.95
172.01 to 173.00	12.02	20.80	193.80
173.01 to 174.00	11.87	20.65	194.65
174.01 to 175.00	11.71	20.50	195.50
175.01 to 176.00	11.56	20.35	196.35
176.01 to 177.00	11.41	20.20	197.20
177.01 to 178.00	11.26	20.05	198.05
178.01 to 179.00	11.12	19.90	198.90
179.01 to 180.00	10.97	19.75	199.75
180.01 to 181.00	10.83	19.60	100.00
181.01 to 182.00	10.69	19.45	201.45
182.01 to 183.00	10.55	19.30	202.30
183.01 to 184.00	10.41	19.15	203.15
184.01 to 185.00	10.27	19.00	204.00
185.01 to 186.00	10.14	18.85	204.85
186.01 to 187.00	10.00	18.70	205.70
187.01 to 188.00	9.87	18.55	206.55
188.01 to 189.00	9.74	18.40	207.40
189.01 to 190.00	9.61	18.25	208.25
190.01 to 191.00	9.48	18.10	209.10
191.01 to 192.00	9.35	17.95	209.95
192.01 to 193.00	9.22	17.80	210.80
193.01 to 194.00	9.10	17.65	211.65
194.01 to 195.00	8.97	17.50	212.50
195.01 to 196.00	8.85	17.35	213.35
196.01 to 197.00	8.73	17.20	214.20
197.01 to 198.00	8.61	17.05	215.05
198.01 to 199.00	8.49	16.90	215.90
199.01 to 200.00	8.375	16.75	216.75
200.01 to 201.00	8.26	16.60	217.60
201.01 to 202.00	8.14	16.45	218.45
202.01 to 203.00	8.03	16.30	219.30
203.01 to 204.00	7.92	16.15	220.15
204.01 to 205.00	7.80	16.00	221.00
205.01 to 206.00	7.69	15.85	221.85
206.01 to 207.00	7.58	15.70	222.70
207.01 to 208.00	7.48	15.55	223.55
208.01 to 209.00	7.37	15.40	224.40
209.01 to 210.00	7.26	15.25	225.25
210.01 to 211.00	7.16	15.10	226.10
211.01 to 212.00	7.05	14.95	226.95
212.01 to 213.00	6.95	14.80	227.80
213.01 to 214.00	6.85	14.65	228.65
214.01 to 215.00	6.74	14.50	229.50
215.01 to 216.00	6.64	14.35	230.35
216.01 to 217.00	6.54	14.20	231.20
217.01 to 218.00	6.445	14.05	232.05
218.01 to 219.00	6.35	13.90	232.90
219.01 to 220.00	6.25	13.75	233.75
220.01 to 221.00	6.15	13.60	234.60
221.01 to 222.00	6.06	13.45	235.45
222.01 to 223.00	5.96	13.30	236.30
223.01 to 224.00	5.87	13.15	237.15
224.01 to 225.00	5.78	13.00	238.00
225.01 to 226.00	5.69	12.85	238.85
226.01 to 227.00	5.595	12.70	239.70
227.01 to 228.00	5.50	12.55	240.55
228.01 to 229.00	5.415	12.40	241.40
229.01 to 230.00	5.33	12.25	242.25
230.01 to 231.00	5.24	12.10	243.10
231.01 to 232.00	5.15	11.95	243.95
232.01 to 233.00	5.065	11.80	244.80
233.01 to 234.00	4.98	11.65	245.65
234.01 to 235.00	4.89	11.50	246.50
235.01 to 236.00	4.81	11.35	247.35
236.01 to 237.00	4.73	11.20	248.20
237.01 to 238.00	4.64	11.05	249.05
238.01 to 239.00	4.56	10.90	249.90
239.01 to 240.00	.....	10.00	250.00
240.01 to 241.00	.....	9.00	250.00
241.01 to 242.00	.....	8.00	250.00
242.01 to 243.00	.....	7.00	250.00
243.01 to 244.00	.....	6.00	250.00
244.01 to 245.00	.....	5.00	250.00
245.01 to 246.00	.....	4.00	250.00
246.01 to 247.00	.....	3.00	250.00
247.01 to 248.00	.....	2.00	250.00
248.01 to 249.00	.....	1.00	250.00
249.01 to 250.00	.....	.00	250.00

Columns 2 and 3 in the above table are explanatory of the method of arriving at the "new rates" included in column 4. The roads will substitute for the "old rates" of December, 1915, scheduled in Column 1, the "new rates" listed in column 4.

In applying the increases prescribed in the preceding tablcs to the wages of men paid on a monthly basis, the roads will substitute for each group of monthly wages of

1915, as listed in Column 1, the amount named in column 4, on the same line.

The inclusion of the percentages contained in column 2 is merely to explain the method of arriving at the amounts contained in column 3, which added to the maximum amount for each group named in column 1 produces the "new rate per month" shown in column 4, on the same line.

Application of these new wages to the present pay rolls of the railroads, as nearly as may be, indicates that the net wage increases granted will approximate $300,000,000 a year. The magnitude of this amount is not staggering when the whole expenditure for wages on the railroads is considered. And whatever its effect upon the mind may be, we regard such an expenditure as necessary for the immediate allaying of a feeling that can not be wisely fostered by national inaction, and as not one dollar more than justice at this time requires.

Application of the Scale

These increases are to be applied to the rates of wages in effect on December 31, 1915. They do not represent a net increase at this time. Because our figures as to the increase of living costs have been gathered with reference to the two-year period January, 1916, to April, 1918, the wage increases are reckoned with respect to the same dates. The telegrapher who holds the same position today that he did the last day of December, 1915, and who then received $75 a month and has received no increase since, will receive an additional wage of $30.75 per month. If he has received an increase in these two years of $10 per month, the recommended increase of his wage will be cut down by that much, making his net advance $20.75. The section hand who on December 31, 1915, received a wage of $50 per month will receive an increase of $21.50 per month, less whatever his monthly wage as section man may have been advanced in the intervening two years.

In the application of the scale the wage runs with the place. If in the past two years an employee has been promoted, his new wage is based upon the rate of increase applicable to the new schedule governing the new place.

Reductions in hours are not to be regarded as increases in pay. This rule is made necessary, first, by its justice, for it is not to be contemplated that hours are reduced to decrease earnings; and, second, by the impracticability of applying any other rule. In some cases the decrease in daily hours did effect an increase in total wages paid, by reason of overtime, but in other cases, where the railroads adjusted themselves to an eight or a nine-hour day, there was no increase in the monthly compensation. To differentiate between these cases would be an interminable task. Moreover, we assume the good faith of all reductions in hours as being what they pretend to be.

There are some few cases where the roads, by reason of abnormal conditions, largely local, and arising out of the extreme competition in certain trades, have granted wage increases which will well-nigh cover, if not altogether cover, the increases here made. As to those who have received such increases, we advise no other course than that the scale be adhered to, for it has its foundation in principle and not in the compelling force of any unusual competitive conditions. In no event, however, should there be any reduction in wages from those now obtaining.

In the application of the scale, that percentage of increase is to be applied which is awarded to the normal time wages paid to the individual in each position in the railroad service on December 31, 1915. There are, however, employees of certain classes, and upon a number of roads, whose wages are paid upon a piecework basis, and there are also numbers of employees on practically all the roads whose hours of service at times run beyond the straight hours of service established for a day's work of the kind they perform. A practical plan for wage increases, in harmony with the scale, has been devised for application to piecework wages and wages for recognized overtime.

We have found much difficulty in adapting the plan to the elaborate and intricate schedules of the trainmen, from which there is apparently no desire on the part of the railroad operators or the trainmen to depart. This, however, we have succeeded in doing in such manner as to translate the increases into mileage rates, thus maintaining the existing schedules relating to the method of pay. Accepting the average monthly earnings of employees in the train and engine service for the fiscal year ended 1915 as accurately reflecting the rates paid to those classes we have adopted, as the percentage of increase to be applied to the mileage rates obtaining for the several classes of trainmen, that percentage of increase which is awarded to employees generally whose earnings are equal to the average earnings of each of the several classes of trainmen. Thus, in the case of road passenger engineers, their average earnings in 1915 were $178.46. The individual employee in any other branch of the railroad service whose monthly wage is $178.46 will receive a wage increase of 11¼ per cent, and the road passenger engineers as a class will receive an increase of 11¼ per cent in their existing mileage rates. And the same method obtains for each of the classes of trainmen paid on the mileage basis.

The Question of a Shorter Work Day

Slowly and steadily, by force of law somewhat, but also by the voluntary act of the employers, a shorter workday is being put into effect. This tendency will continue, and the shorter day will come to be regarded, not as a means of minimizing the returns which the worker gains, but as a conserver of the human material upon which industry rests. This matter of work time must be submitted to the pragmatic test. Society will come to see that there is a maximum which is beyond the plimsoll mark of wisdom, and a minimum that makes society in many ways the sufferer. The line of moderation, the medial line, is one that must be proved by experience. The wise employer will look with sympathetic eye to find it, and the wise employee will attempt in good faith to make it manifest. It would be a splendid achievement if we could at this time crystallize the experience of the world into a conclusion concerning the length of the workday that would be of universal application. But this is not possible now for many reasons, not the least of which is an insufficiency of data touching so many and such diverse employments.

This, moreover, is not the time, in the judgment of the commission, to make experiments which might lessen the output of that commodity which railroad men produce—tons of freight hauled and numbers of passengers carried. The one thing now imperative is volume of and speed in railroad output.

Hours of Labor Cannot Be Shortened

The railroad employees have asked for the shorter day, saying frankly that they did not wish an increased rate for overtime save as a means of compelling the observance of shorter hours—a penalizing of the employers for too long a work day. At this time, however, when urgent and serious necessity compels sacrifice from all, to penalize the government for working its men as long as they have been in the habit of working under their private employers, the railroad companies, is to take advantage of the two-fold embarrassment of the government—its need for the work and its inability to call in outside men. The commission does not believe that the railroad employees really want thus to hamper the transportation facilities of the country in its hour of need.

While the commission is strongly disposed to a standard

day, in so far as the nature of the service will permit it, its firm judgment consequently is that the existing hours of service in effect on the railroads should be maintained for the period of the war.

But with this we earnestly urge that a most exhaustive study be made of this matter of hours of service, not with a view to the adoption of some arbitrary and universal policy which shall have no regard to the kind of work done, or to the effect upon the railroad service, but with these very considerations in mind.

Overtime Pay

Closely allied to the matter of hours of service is that of extra pay for overtime. In fact, the whole theory of those who speak for labor is that extra pay for overtime is the logical way to force the standard day of reasonable hours with no work thereafter. In that theory there may or may not be force; but quite apart from such view, certain it is that in harmony with the broader idea that fair hours of rest and recreation are the laborer's right, the use of those hours in industry may well be obtained only at a wage much above the normal. With overtime as with hours of service, however, the commission believes that the existing rules and conditions of payment should not be disturbed during the period of the war. But at the time when the study of the matter of hours of service is made, that study must sympathetically cover also the broad and kindred field of compensation for the overtime which is necessary in certain classes of service.

Apprentices

Organized labor realizes that at a time when men are being speeded up in the colleges by being given special courses in chemistry and other scientific subjects necessary for war work, the rules of inhibition touching the term of apprentices must be liberalized so that those who are competent shall the more quickly be enabled to place their full skill at the Nation's service. It is the view of the commission that the full measure of the increases herein suggested shall go only to those above 21 years of age, and that those from 18 to 21 shall have three-fourths of such increases, and those under 18 one-half of such increases. This rule, however, might well be modified to this extent, that if apprentics are graduated into the full status of journeymen before they have reached 21 years they shall have the full pay of this new status.

Floating Equipment Employees

This award shall be construed to apply to employees of railroads operating ferries, tugboats, lighters, barges and any other floating equipment operated as terminal or transfer facilities, but shall not be construed as applying to railroad employees on, or in connection with the operation of, cargo and passenger carrying equipment on lakes or rivers, or in coastwise or ocean traffic.

Wage Adjustment by Other Boards

The award of the commission shall not be applicable to those employees whose compensation is the result of adjustments by or through any agency established for the purpose by the Navy Department, the War Department, the Department of Commerce, the United States Shipping Board, or any other government agency created since the entry of the United States into the war.

Effective as of January 1

The wage increases provided for in the scale shall be effective as of January 1, 1918, and are to be paid to all who were then in the railroad service or who have come into such service since and remained therein, according to the time served. The proper ratable amount shall also be paid to those who have been for any reason since January 1, 1918, dismissed from the service, but shall not be paid to those who have left it voluntarily, because remaining in the service was the consideration of the promise to make the increases effective from the date mentioned. Men who have left the railroads to enter the army or navy shall be entitled to the pro rata increases accruing on their wages up to the time they left, as they have continued in the service of the Nation. The same rule shall apply to those who have passed from one branch of the railroad service or from one road to another.

Employment of Women

The employment of women is one of the important problems confronting those in charge of the actual operation of the railroads. Up to the time of the abnormal demand for labor created by the European war, women were not extensively employed by the railroads except as stenographers and clerks in the offices, and as charwomen, car washers, and cleaners, and other employments of like character. Since the war they have entered the shops, have engaged in handling freight and baggage, and have even been employed upon the tracks. Much of this work requires a physical effort beyond the strength of women, and some of it is carried on under conditions menacing to health, safety and morals.

The labor in our shops and elsewhere must be diluted as the war takes to itself an increasing number of men. Women must, to some degree, take these places. They should be cared for. Their burden should not be such as to hazard their health. Their hours should be reasonably short. Their working conditions should be healthful and fitted to their needs. And their pay, when they do the full work of men, should be the same as that of men.

Discrimination Against Employees

The investigation of the commission disclosed many inequalities of pay in the same branch of service, not only as between different sections of the country but in the same section. The attention of the railroad managers should be directed to these inequalities, with a view to removing them whenever the discrimination is not justified by differences in the efficiency of the labor, the cost of living, or other conditions legitimately affecting the rate of wages. In every case where the same service is rendered there should be the same pay without regard to sex or race.

Members of organizations and non-members must stand upon the same footing. In some branches of the service, and this is peculiarly true of those least paid, there are no organizations, or, if any, they are limited in their membership and restricted in their locality. But, whether organized or unorganized, the purpose must be duly to consider every branch of the service and to accord fair treatment to all.

Salaries of Officers

In carrying out the direction to "make a general investigation of the compensation of persons in the railroad service," the investigation obviously included a consideration of the compensation of those persons who are classed as officials. The commission, therefore, by an individual "questionnaire" which all officials were required to answer, and also by a report obtained from each railroad, secured the names of all persons receiving a compensation of $5,000 and upward, together with a full statement of the services performed by each of them.

The total compensation for the year ending December 31, 1917, paid to such officials is approximately $30,000,000. The individual salaries varied from $5,000 to $100,000. It is reasonably certain from the facts gathered by the commission that a substantial readjustment of such salaries may be made and the efficient operation of the railroads promoted

thereby. Such readjustment of salaries, however, presents an individual proposition as applicable to each official. Some salaries may well be abolished altogether, others greatly reduced, while in some cases of lesser paid officials an increase would be warranted.

The commission recommends that during the period of government conduct of the railroads no salaries paid to officials who are not essential to the operation of the roads shall be charged as part of the operating expenses, and that a careful study be made of the proper relation between the salaries of the higher officials and those of their subordinates with a view to readjustments in the interest of the highest efficiency of the service.

There should be constituted a tribunal or tribunals to continue the study of railroad labor problems composed, in part at least, of men experienced in this kind of work, for as to these problems there can be no finality. Many complaints have been made to us by individuals and groups of men which it was impossible for us to investigate, and which should be investigated and redress afforded if the complaints are well founded. Among these are differences of pay where there are no, or only negligible, differences in the services rendered. Conditions of employment are described which, if the descriptions be true, demand amelioration. A commission for each of the general divisions of the railroad system would undoubtedly be fully occupied for a long time in dealing with such matters. In the meantime the managers or other officials operating the several roads could do much to improve the situation by dealing with the conditions on their respective roads.

Importance of Railroads

It would be impossible to magnify the importance of the American system of railroads in the conduct of the war. That England should want for bread because American railroad equipment was unwisely distributed or unnecessarily immobile is a thing not to be explained to the Englishman, who regards our system of railroads and our method of railroading as the model for the world, excelling either public or private systems elsewhere.

For our needs and for our pride this standard of superiority must be maintained, and to this end no other one thing will so greatly conduce as wisdom and justness in dealing with the actual workers on the roads. What has been here done is perhaps all that can be done now. The spirit which prompted the commission should not be permitted to languish or to flatten out into expansive inefficiency. The labor problem is never one exclusively of wages or hours. When it does become no more then the human element has gone out of the management; it has become too remote in space or in spirit to make good. The table of wage increases presented in this report we urge should be construed in the largest spirit of liberality, so as to draw forth from the men a recognition of that sense of reciprocity which it speaks—good wages for good service. The policy comes from above; its sympathetic application must be left to those below.

We desire in closing this report to express our most sincere appreciation of the services rendered to the commission by Frederick W. Lehmann, as counsel; by William A. Ryan, as secretary; by Edward J. Barcalo, Riley L. Redpath, and Lathrop Brown, as the board of examiners; and by William A. Hathaway, J. C. Bowen, Charles P. Neill, Fred A. Burgess, A. O. Wharton, and C. W. Hillman, as special statisticians.

Appendix

Appendix 1 is a report of Special Statistician W. A. Hathaway of studies of the methods adopted by the British and French governments to adjust the wages of railroad employees to meet the war emergencies.

Cost of Living

Appendix 2 gives the results of an exhaustive inquiry instituted by the commission into the question of the cost of living during 1917 and 1918 compared with the pre-war period. The investigation was divided into two parts, Relative Price Changes, and Family Budgets. Since there was no material rise in prices until the latter part of 1915 the investigations were confined to the period 1915 to 1917. The increases in the various items of the family budget from January 1, 1916, to January 1, 1918, were ascertained to be: Food 52 per cent, rent 10 per cent, clothing 44 per cent, fuel and light 31 per cent, sundries 35 per cent. Weighing these increases according to the proportion of expenditure for each item for different sized incomes, the following percentages of increase in the cost of living were obtained:

Families with incomes up to $600..... 40 per cent
Families with incomes from $600 to $1,000..... 38 per cent
Families with incomes from $1,000 to $2,000..... 37 per cent

These figures were later revised in a supplementary report on April 25, based on later price changes to 43 per cent, 41 per cent and 40 per cent, respectively. It is stated that these figures show how much more it would have cost to live in 1918 than on January 1, 1916, provided the standards of living remained the same, but because of the difficulty in determining accurately the relative increase in the cost of living the figures were interpreted conservatively and applied in a general rather than in a precise way.

The 265 family budgets collected by the commission through the newspapers are grouped by districts and by incomes. The average annual income of the 265 families in 1915 was $1,031 and in 1917, $1,162, while the average annual expenses were $955 in 1915 and $1,210 in 1917. In 1915 the average family, therefore, had a surplus of $76 while in 1917 the average family had a deficit of $48. In 1915, 169 families had a surplus, while 73 had a deficit. In 1917, 96 families had a surplus, while 140 had a deficit.

Monthly Wages

In Appendix 3 is given a statement compiled from the returns of Class 1 railroads and certain switching and terminal companies showing the rates of pay for the month of December, 1917, graded according to the monthly rates. These rates are discharged of all compensation for overtime or extra service and, therefore, constitute a table of wages, not of earnings. The table is as follows:

NUMBER OF EMPLOYEES OF ALL CLASS 1, SWITCHING AND TERMINAL RAILROADS IN THE UNITED STATES, GRADED ACCORDING TO MONTHLY RATES OF PAY

(Col. 1)	Eastern District (Col. 2)	Southern District (Col. 3)	Western District (Col. 4)	Total for United States (Col. 5)	Per cent by classes (Col. 6)	Cumulative per cent (Col. 7)
$30 or less	8,319	10,173	8,871	27,363	1.41	1.41
$30 to $35	5,626	18,450	8,464	32,540	1.68	3.09
$35 to $40	8,289	25,362	17,716	51,367	2.65	5.74
$40 to $45	11,167	18,381	17,930	47,478	2.45	8.19
$45 to $50	14,841	20,961	44,173	79,975	4.11	12.30
$50 to $55	40,185	18,727	50,964	109,876	5.67	17.97
$55 to $60	71,060	17,553	67,952	156,565	8.07	26.04
$60 to $65	101,054	15,480	65,159	181,693	9.37	35.41
$65 to $70	76,078	15,514	45,767	137,359	7.08	42.49
$70 to $75	70,947	20,347	74,108	165,402	8.53	51.02
$75 to $80	77,285	17,416	54,922	149,624	7.72	58.74
$80 to $85	60,660	13,575	48,244	122,479	6.32	65.06
$85 to $90	53,759	11,726	35,881	101,357	5.23	70.29
$90 to $95	49,497	10,653	36,316	96,466	4.97	75.26
$95 to $100	45,374	7,838	34,959	88,171	4.55	79.81
$100 to $110	55,688	16,391	45,589	117,668	6.07	85.88
$110 to $120	42,618	10,613	31,307	84,538	4.36	90.24
$120 to $130	32,895	4,865	20,252	58,012	2.99	93.23
$130 to $140	18,080	5,412	18,323	41,815	2.16	95.39
$140 to $150	13,074	4,748	14,802	32,624	1.68	97.07
$150 to $160	9,119	1,924	5,246	16,289	.84	97.91
$160 to $170	5,814	2,153	5,833	13,800	.71	98.62
$170 to $180	4,693	1,035	3,342	9,070	.47	99.09
$180 to $190	2,672	702	1,947	5,321	.27	99.36
$190 to $200	2,436	698	2,015	5,149	.26	99.62
$200 to $210	1,113	296	711	2,120	.11	99.73
$210 to $220	714	238	551	1,503	.08	99.81
$220 to $230	714	262	558	1,534	.08	99.89
$230 to $240	338	74	258	670	.03	99.92
$240 to $250	717	210	644	1,571	.08	100.00
Totals	884,818	291,777	762,804	1,939,399	100.00	

Wages by Classes

Another table shows the average earnings per month of employees in each occupational class in each district and for the United States as a whole separately presented for each of the years 1915, 1916 and 1917, compiled as to 1915 and 1916 from reports to the Interstate Commerce Commission and for 1917 from reports to the Railroad Wage Commission, as follows:

The aggregate annual compensation of the same men based on the average monthly earnings during the year ended December 31, 1917, is $1,917,419,220, showing that the railroads during that period had made increases amounting to $306,000,000. The aggregate annual compensation based upon the application of the commission's schedule to the average monthly earnings for the year ended June 30, 1915, is $2,205,432,938, showing an increase compared with 1915

AVERAGE MONTHLY EARNINGS OF EMPLOYEES OF CLASS 1 RAILROADS IN THE UNITED STATES, DURING THE FISCAL YEAR ENDED JUNE 30, 1917, AND THE CALENDAR YEARS ENDED DEC. 31, 1916 AND 1917, RESPECTIVELY

	Occupations	1915 (1) Eastern district	1915 (2) Southern district	1915 (3) Western district	1915 (4) Total U. S.	1916 (5) Eastern district	1916 (6) Southern district	1916 (7) Western district	1916 (8) Total U. S.	1917 (9) Eastern district	1917 (10) Southern district	1917 (11) Western district	1917 (12) Total U. S.
1.	General officers, $3,000 p. a. and upwards	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	General officers, below $3,000 per annum	$161.02	$122.22	$102.18	$151.88	$169.36	$136.09	$147.42	$151.91	$168.02	$131.23	$152.37	$152.63
3.	Division officers, $3,000 p. a. and upwards	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	Division officers, below $3,000 per annum	146.47	132.80	153.23	147.62	147.00	136.74	154.64	147.64	154.95	144.88	161.68	155.27
5.	Clerks, $900 p. a. and upwards (except No. 37)	98.55	88.54	91.66	94.05	101.09	95.57	98.53	99.16	102.75	101.36	101.56	102.08
6.	Clerks, below $900 p. a. (except No. 37)	55.50	50.98	52.21	54.17	58.28	53.94	55.81	56.86	57.84	54.66	55.97	56.77
7.	Messengers and attendants	40.60	29.51	39.34	36.17	40.12	32.93	41.93	39.26	42.82	36.83	46.42	42.84
8.	Assistant engineers and draftsmen	97.52	93.72	88.02	93.42	93.66	98.63	92.25	93.76	94.72	96.76	95.26	95.22
9.	M. W. & S. foremen (excluding Nos. 10 and 28)	88.13	82.57	100.49	92.26	93.56	86.71	97.47	94.36	99.57	92.52	102.72	100.00
10.	Section foremen	66 68	59.60	63.42	64.30	71.60	63.17	67.08	67.98	77.60	68.65	73.11	73.89
11.	General foremen—M. E. department	126.78	137.82	123.45	127.77	129.29	133.39	132.01	131.13	140.27	138.69	134.98	137.73
12.	Gang and other foremen—M. E. department	93 06	96.84	103.20	97.24	100.95	103.21	104.84	102.68	111.79	114.59	113.37	112.76
13.	Machinists	80.71	83.83	94.89	85.87	95.61	97.72	107.98	100.42	110.87	117.89	123.39	116.35
14.	Boiler makers	84.15	86.97	98.32	89.68	96.60	99.00	110.89	102.46	112.15	120.37	126.88	118.85
15.	Blacksmiths	76.05	71.30	81.41	77.21	89.63	84.94	93.41	90.22	103.41	102.32	108.17	104.94
16.	Masons and bricklayers	68 55	50 51	78.71	65.76	78.17	63.56	85.32	77.47	81.62	58.50	77.00	77.15
17.	Structural ironworkers	71.16	43.38	106.71	74.84	80.61	67.24	107.92	85.88	81.74	75.66	93.10	84.38
18.	Carpenters	66.80	56.85	64.79	64.00	74.40	60.63	73.75	71.51	80.41	70.15	80.08	78.45
19.	Painters and upholsterers	63.19	55.20	66.83	63.15	73.77	63.14	72.23	71.44	80.66	73.37	79.90	79.10
20.	Electricians	74.98	75.18	84.80	78.44	78.42	74.10	83.92	79.74	83.79	85.52	89.47	86.03
21.	Air-brake men	66.26	67.20	70.84	67.63	79.28	72.89	79.57	78.49	91.57	91.96	87.54	90.41
22.	Car inspectors	69.20	77.18	80.30	73.48	77.01	83.62	86.98	81.11	91.08	104.21	98.63	95.24
23.	Car repairers	62.72	55.37	66.40	62.24	71.34	62.48	68.82	68.80	85.92	79.88	80.44	82.78
24.	Other skilled laborers	71.49	61.18	75.77	71.07	80.66	70.38	77.26	77.99	91.02	84.05	87.80	88.90
25.	Mechanics' helpers and apprentices	52.54	39.21	53.32	50.39	60.44	46.57	59.92	58.01	71.44	55.33	70.67	68.58
26.	Section men	39.81	29.93	39.43	37.68	48.54	31.64	42.15	42.41	57.19	36.64	50.95	50.31
27.	Other unskilled laborers	48.66	39.25	48.24	46.44	53.42	40.21	53.48	50.71	63.01	45.34	60.18	58.25
28.	Foremen of const. gangs and work trains	79 76	80.27	93.79	84.36	81.96	77.81	71.83	77.54	90.35	82.10	80.73	85.78
29.	Other men in const. gangs and work trains	40 98	36.20	48.89	42.88	51.95	30.50	48.30	46.35	59.56	32.87	55.51	52.44
30.	Traveling agents and solicitors	126.83	117.27	124.65	123.83	131.88	126.60	131.28	130.54	135.65	129.83	140.39	136.73
31.	Employees in outside agencies	75.46	70.15	102.01	81.65	78.23	71.87	107.17	86.81	85.00	72.15	102.43	88.10
32.	**Other traffic employees**	72.70	68.96	90.91	79.97	74.90	118.85	123.10	99.56	92.84	117.97	128.91	110.68
33.	Train despatchers and directors	122.88	127.37	148.83	132.99	134.40	132.26	157.92	143.45	139.92	138.94	164.41	149.76
34.	Telegraphers, telephoners, and block operators	63.17	64.22	71.41	66.15	68.22	69.71	76.54	71.55	73.79	73.79	80.25	76.29
35.	Telegraphers and telephoners operating interlockers	68.42	70 80	66.69	68.47	73.20	71.76	68.65	72.50	80.30	82.55	72.64	79.60
36.	Levermen (non-telegraphers)	60.06	53.53	64.82	60.90	65.62	53.91	65.85	64.73	73.07	63.26	69.74	71.09
37.	Telegrapher-clerks	62.33	65.69	70.54	66.32	67.24	66.53	71.59	69.24	72.80	73.15	75.72	74.31
38.	Agent-telegraphers	66.36	66.79	71.16	68.50	70.33	70.73	72.92	71.69	76.81	79.99	80.15	79.04
39.	Station agents (non-telegraphers)	81.23	70.29	77.94	77.63	84.31	64.38	82.90	79.37	90.61	70.74	91.75	86.61
40.	Station masters and assistants	100.20	76.51	82.03	91.29	112.13	78.58	84.28	84.08	115.03	105.79	90.36	106.96
41.	Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66	52.53	34.65	56.15	50.22	57.27	37.59	59.87	54.73	60.99	43.72	62.14	58.57
42.	Yardmasters	131.40	121.20	135.83	131.09	134.12	131.14	139.03	135.35	150.08	140.24	157.28	151.12
43.	Yardmaster's assistants (not yard clerks)	119.69	108.21	123.44	118.79	128.79	119.63	136.25	129.29	140.31	131.17	157.68	143.45
44.	Yard engineers and motormen	126.50	120.52	131.24	126.76	132.57	127.26	141.32	134.39	147.50	146.74	155.27	149.78
45.	Yard firemen and helpers	78.15	64.98	78.24	75.99	81.95	70.43	88.66	82.30	91.70	81.57	95.94	91.66
46.	Yard conductors (or foremen)	113.21	104.66	116.30	112.66	117.97	109.50	123.93	118.61	130.62	127.33	138.19	132.52
47.	Yard brakemen (switchmen or helpers)	96.38	87.65	104.51	91.93	100.23	85.91	105.89	99.81	111.35	96.13	118.04	111.18
48.	Yard switch tenders	60.90	55.13	58.26	59.99	64.68	56.33	59.15	62.99	72.73	58.87	67.52	70.48
49.	Other yard employees	54.68	48.97	46.34	51.45	53.89	29.08	50.98	46.71	59.17	43.26	58.56	56.01
50.	Hostlers	79.99	80.12	83.03	80.95	85.13	83.53	94.23	87.93	100.92	100.83	109.19	103.68
51.	Enginehouse-men	57 68	44.59	61.26	56.58	64.24	48.96	60.67	60.18	76.50	55.89	68.57	69.70
52.	Road freight engineers and motormen	149.22	159.20	154.71	152.75	145.04	148.48	169.36	154.32	167.38	171.06	188.39	175.64
53.	Road freight firemen and helpers	94.44	88.71	96.41	94.10	90.61	79.00	105.11	93.82	104.09	90.14	116.22	106.11
54.	Road freight conductors	131.25	125.87	135.15	131.59	129.09	124.73	146.01	134.77	151.50	144.53	162.51	154.56
55.	Road freight brakemen and flagmen	85.19	76.89	92.09	85.83	83.88	74.69	99.95	87.70	97.90	86.09	110.23	100.17
56.	Road passenger engineers and motormen	170.28	190.24	182.68	178.46	165.03	185.89	187.89	177.04	171.68	202.16	196.64	185.93
57.	Road passenger firemen and helpers	104.10	100.32	113.69	106.87	101.48	100.09	118.73	108.11	103.93	110.12	124.27	112.83
58.	Road passenger conductors	155.28	146.82	154.33	153.57	153.99	150.99	161.23	156.41	161.87	162.81	166.17	163.75
59.	Road passenger baggagemen	93.31	84.31	68.77	87.03	93.63	90.85	85.66	91.49	99.59	99.11	92.55	98.01
60.	Road passenger brakemen and flagmen	90.51	72 30	82.42	85.23	89.06	76.30	84.96	85.94	94.61	84.68	88.71	91.10
61.	Other road train employees	73.73	68.07	67.67	69.00	85.87	47.94	68.51	65.75	86.19	51.17	71.68	68.11
62.	Crossing flagmen and gatemen	39.97	35.48	40.27	39.59	42.06	34.44	40.03	40.89	46.04	37.11	43.64	44.65
63.	Drawbridge operators	60.38	40.82	58.55	55.33	63.91	45.10	60.63	58.62	69.33	49.95	64.85	63.50
64.	Floating equipment employees	63.55	56.35	68.62	54.61	74.92	58.50	74.30	74.36	78.76	54.98	92.17	79.94
65.	Express service employees	49 08	36.00	.....	.....	.....	62.67	.....	67.25	8.14	6.82	.....	7.15
66.	Policemen and watchmen	58 75	50 05	65.91	59.15	69.95	54.17	68.85	67.23	75.56	58.63	80.04	74.84
67.	Other transportation employees	55.30	45.05	47.50	52.00	51.17	47.89	66.41	56.35	65.37	60.47	80.12	70.31
68.	All other employees	57.05	40.34	41.28	50.53	54.72	51.22	49.23	51.84	59.90	51.22	53.28	55.48

Effect on Operating Cost

The commission made an estimate of the probable effect of the new rates upon the cost of operating the railroads during 1918 by applying to the average monthly earnings of each class of employees the rate per cent of increase prescribed for that amount, as disclosed by the table of increased rates in the main body of the report. This estimate was based only on Class 1 railroads, including 1,939,399 employees. The aggregate annual compensation based upon the average monthly payment of men in the same classes during the year ended June 30, 1915, is $1,611,567,384. of $593,865,554 or 36.85 per cent, and an increase as compared with December 31, 1917, of $288,013,718, or 15.02 per cent.

The report also includes tables of increases of daily wages for a 26-day month or a 31-day month and of hourly wages. For example, where the old rate per day was 75 cents, the new rate is $1.52 for a 26-day month and $1.40 for a 31-day month. These figures are arrived at by computation from the table of percentages applied to the monthly earnings. Where the old hourly rate was 10 cents the addition of $20 per month makes a new hourly rate of 19.75 cents

for eight-hour workers, 18.5 cents for nine-hour workers, 17.75 cents for ten-hour workers, 17 cents for eleven-hour workers and 16½ cents for 12-hour workers. The following illustrations are given of the application of the rates to employees on daily, hourly and monthly rates of pay:

Application of Rates to Employees on a Daily Rate of Pay

Sectionman C was employed in 1918, but not in 1915. The rate of pay on the division where he is employed in 1918, in 1915 was $1.10 per day of 12 hours, 7 days a week. The 1918 rate of pay is, on the same division, $1.50 per day, for the same hours. The monthly rate in 1915 was therefore $33. It is now $45. Under the commission's plan of increases he will be entitled to $53 per month ($20 increase), or $8 per month more than his present rate for straight time. He will, therefore, be entitled to receive from January 1 to April 30, $32 back pay and in the future to receive $53 per month of 360 hours. His back pay will be computed in the same manner for all overtime worked since January 1, 1918.

Employees on an Hourly Rate of Pay

Machinist "D" was employed in the same shop in 1915 and in 1918 on the same class of work. His hourly rate in 1915 was 35 cents for 9 hours, 26 days a month. He was paid for overtime and Sunday work at time and one-half. In 1918 his hours were reduced to 8 and his rate increased to 40 cents.

According to the commission's plan his increase will be computed on the basis of his standard 1915 hours at the 1915 rate, viz.: 234 hours per month, $81.90 per month, entitling him to 40 per cent increase in his hourly rate, or 49 cents per hour. In 1918, from January 1 to April 30, he worked 234 hours per month, or an average of 1 hour daily overtime, on the 1918 schedule. This for four months gives him 104 hours overtime. He has been paid as follows:

832 hours straight time at 40 cents	$332.80
104 hours overtime at 60 cents	62.40
	$395.20

His back pay will be computed as follows:

832 hours straight time at 49 cents per hour	$407.68
104 hours overtime at 73½ cents per hour	76.44
	$484.12
Deduct payment at 1918 rates	395.20
Back pay due	$88.92

and his future rate per hour will be 49 cents.

If the rate per hour for this particular position had been increased to 50 cents on January 1, 1918, there would be no back pay due, and the rate of 50 cents per hour would be continued.

In the case of machinist "E" who was employed in a shop where the rate for his position was 35 cents per hour for 8 hours work in 1915, with time and one-half for overtime, but in the same position and same shop with the same hours in 1918 his rate is 45 cents per hour; his earnings in 1915 in the standard 208 hour month would be $72.80 per month, and he would be entitled to 41 per cent increase in his hourly rate, viz.: to 49½ cents per hour. His straight time and overtime earnings and back pay would be computed in exactly the same manner as machinist "D." The principles illustrated will apply to all men paid by the hour, whatever their occupation may be.

Employees on a Monthly Rate of Pay

Chief Clerk A occupied the same position in 1915 and in 1918:

1915 salary	$150 per month
1918 salary	175 per month

Commission's basis of increase on salaries of $150 per month is 16.17 per cent, or $24.25 per month. Increased salary under commission's plan, $174.25; present salary, $175. Present salary undisturbed.

Clerk B in 1915 received $100, and on the same desk in 1918 received $112.50 per month. Commission's basis of increase on $100, 31.75 per cent, or $31.75. Increased salary under commission's plan, $131.75. Present salary $112.50. Clerk B is entitled to receive back pay from January 1 to date of the award, at the rate of $19.25 (the difference between $131.75 and $112.50) and to receive monthly, hereafter, $131.75 instead of $112.50. Back pay due January 1 to April 30, $77.

Application of Increases to Pieceworkers

The piece worker is to receive for each hour worked the same ratio of increase per hour as is awarded to the hourly worker engaged in similar employment in the same shop. If the hourly rate has been increased since 1915 to an amount greater than the increase awarded by the commission, then the higher rate shall prevail. Where there was no piece rate for an item or operation in the piece rate schedule of 1915, the current price is to be adjusted by such an amount as a similar item or operation has been increased or decreased since December 31, 1915, or as near such a plan as practicable. When a piecworker works overtime or undertime, he is to receive that proportion of the increase provided in the schedule, which the time actually worked bears to the normal time in the position.

The plan devised for translating the increases applied to employees generally into mileage rates as applicable to employees in train and engine service is stated in Appendix 6 as follows: There are nine classes of train and engine employees in the Interstate Commerce Commission's classification.

The commission has computed the average monthly earnings of each of these classes for the fiscal year 1915 and applied to the mileage rates paid to these classes in 1915 the same rate per cent which is awarded to the other employees whose monthly straight time wages equal that average. This process is more clearly disclosed by the following table:

	Average monthly earnings 1915	Rate per cent increase in mileage rates
Road freight engineers and motormen	$152.75	15½
Road freight firemen and helpers	94.10	34¼
Road freight conductors	131.59	20½
Road freight brakemen and flagmen	85.83	39½
Road passenger engineers and motormen	178.46	11¼
Road passenger firemen and helpers	106.87	28¾
Road passenger conductors	153.57	15½
Road passenger baggagemen	87.03	38¼
Road passenger brakemen and flagmen	85.23	39½

The actual application of this percentage system has been worked out in tables showing that for the rates for passenger engineers and motormen in 1915 ranging from $4.10 per 100 miles to $7 per 100 miles will be substituted new rates ranging from $4.56 per 100 miles to $7.79 per 100 miles. This plan will apply to all employees of the train and engine service that are paid on the mileage basis. On railroads upon which men in the train and engine service are paid on a monthly wage the employees will be entitled to the increased rates provided in the standard table. Rates for overtime now in effect are to be increased by the same percentage as straight time rates. If there were mileage rates in effect in 1915 which are not included in the tables they are to be increased in accordance with the percentages contained in the standard table. The following illustration is given of the method of applying increases to employees paid on a mileage basis.

Increases to Employees Paid on a Mileage Basis

Engineer "G" received $4.25 per 100 miles in 10 hours in 1915. According to the commission's plan, although in 1918 this rate was $4.25 per 100 miles in 8 hours, the rate

will be increased 11½ per cent to $4.73 per 100 miles (4.7281 equalized as $4.73). He will be entitled to back pay, for every 100 miles run, at the rate of 48 cents per 100 miles.

If the schedules provide for time and one-half for overtime or any other rate in excess of the straight time rate, then he shall be entitled to receive a proportionate increase of pay for overtime mileage.

If the schedules provide for pro rata payment for overtime, back pay will be computed on that basis.

Rates for future earnings will be as fixed by the commission's schedule of increases to employees paid on the mileage basis. If any increase has been made in the mileage rates of employees paid on that basis in 1915 it will be understood that the per cent of increase allowed by this commission is inclusive of such interim increases and that the new rate per 100 miles is computed from the base rates of 1915.

Hours of Service

Charts are presented in Appendix 7 showing the prevailing hours of service in railroad employment in December, 1917, based on a study of 262,637 employees. Of these 64.25 per cent worked six days a week and 35.75 per cent worked seven days a week. Of the six-day workers 1.17 per cent worked 12 hours or more per day regularly, 1.42 per cent worked 11 hours, 40.12 per cent worked 10 hours, 7.3 per cent worked nine hours and 14.25 per cent worked eight hours. Of the seven-day workers 11.75 per cent worked 12 hours, 3.21 per cent worked 11 hours, 12.59 per cent worked 10 hours, 2.35 per cent worked nine hours and 5.84 per cent worked eight hours. Another series of charts shows the percentage of employees working six or seven days per week who regularly perform overtime service. Of the six-day workers 96.8 per cent worked no overtime, 1.74 per cent worked one hour overtime, .67 per cent worked two hours overtime, .76 per cent worked three hours overtime and .03 per cent worked four or more hours overtime. Of the seven-day workers 93.28 per cent worked no overtime, 2.32 per cent worked one hour overtime, 1.85 per cent worked two hours overtime, .67 per cent worked three hours overtime, and 1.88 per cent worked four or more hours overtime.

In Appendix 8 is given a table for the years ended June 30, 1915, December 31, 1916, and December 31, 1917, showing the average earnings per year of each class of railroad employees. From this table may be ascertained the extent of the increases made by the carriers and the wages of their employees in each district in the past three years.

In Appendix 10 are given separately statistics concerning the rates of wages and conditions of employment of employees of the Pullman Company which it was not found feasible to combine with those of the roads. These are presented as an indication of the effect which the commission's plan of increases may have upon that company and its employees.

SOLDIERS USE OLD RAILWAY TIES.—Condemned and discarded railroad ties have been utilized by American soldiers stationed at Fort Hancock, Texas, to build semi-permanent houses for the headquarters and other buildings of the army camp patrol headquarters. The ties are stood on ends to make the walls of the houses and discarded railroad rails are used for rafters. Ties are then laid over these to form the flat roof and a coating of adobe mud spread over these clinked ties to make the roof watertight. The crosstie houses are more comfortable in winter and summer than tents. The orderly room, the day room and canteen and the quartermaster supply room are all made of these materials, the canteen having a brick floor and plastered roof.

Proceedings of the Air Brake Association Convention

THE TWENTY-FIFTH ANNUAL CONVENTION of the Air Brake Association was held at the Hotel Winton, Cleveland, Ohio, on May 7 to 10 inclusive, with C. H. Weaver, supervisor air brakes, New York Central Lines west of Buffalo, presiding.

Opening Addresses

In opening the convention President Weaver reviewed the circumstances which led up to the decision of the executive committee to hold the convention, and said in part as follows:

At no time in the history of our association can the air brake man be of such value to his company as at the present war period, by seeing that all air brake work is properly performed and no material wasted. Work slighted or improperly done causes failure. Failures mean delays to traffic and even disaster.

Let the slogan of this convention be to improve the efficiency of the air brake man, thereby making his service to the railroad more valuable. We are not assembled here today as individual units each representing some particular railroad, but as each railroad represents a part of the whole, we are united under one head, organized for the purpose of winning this war.

Following Mr. Weaver's address, D. R. McBain, superintendent motive power of the New York Central Lines west of Buffalo, addressed the convention in behalf of better maintenance of piping, cylinders, pipe connections, etc., on freight car equipment. He called attention to the effect a concerted campaign on the part of all of the members of the association, scattered as they are, all over the continent, might have in improving the condition of freight car brake equipment, especially at the present time when no thought of competitive activity as between the various railroads should be given consideration.

A report on Slack Action in Long Passenger Trains was then presented, of which the following is an abstract:

Slack Action in Long Passenger Trains

Slack action in any train is produced only by a change in velocity between the various cars comprising such train, the degree or severity depending upon the rate at which the change in velocity takes place, and the weight and number of cars involved. Shocks may be produced by: (a) Shutting off the engine throttle quickly and applying the engine and train brakes somewhat heavily; (b) applying the engine brakes and then the train brakes; (c) trains with brake conditions that produce effective braking power on the engine and head cars in advance of the rear cars; (d) cars in a train having a lower percentage of braking power than the balance of cars, which may be due to their being loaded in one case and empty in another; (e) inability to produce a low-brake cylinder pressure in the beginning of a brake application.

Even though all these conditions exist, with the exception of the last one, if the engineer so manipulates the brake that light brake cylinder pressure will be obtained when the brake application is first started, any slack action will, of course, occur slowly, and will not be noticeable in the form of shocks.

Inability to produce low brake cylinder pressures may be due to small brake cylinder volumes in proportion to auxiliary reservoir volumes, short piston travel, or the use of too large auxiliary reservoirs. If it is possible to provide and maintain a piston travel that will permit of low cylinder pressures being obtained, this would be the only change necessary in existing types of brake equipment.

Under pneumatic operation of the brakes, increasing the

percentage of braking power on the locomotive and also on the load carrying cars, which might be operated in the forward end of trains, might prevent the slack running out in the form of jerks, but at very low speeds it would increase the tendency for a collision between the head end and rear end of the train, unless provision was made to apply the brake so slowly that the slack action would not be noticeable.

A form of foundation brake gear can be employed which will permit of a longer piston travel being maintained than is common with the single shoe type so largely employed at the present time. This can be depended upon, if equipped with automatic slack adjusters, to maintain the piston travel at practically that for which the operating parts of the brake were designed; viz., eight inches, without greatly increasing the piston travel during brake applications when the train is running, thus insuring a low brake cylinder pressure in the beginning of brake applications, regardless of the train's speed.

With the single shoe type of foundation brake gear now in common use, considerable false piston travel exists. Under such conditions, if the piston travel cannot be maintained sufficiently long when the car is standing to provide necessary flexibility when the car is running and it is not desired to increase the brake shoe clearance, it is necessary to provide an increased brake cylinder volume in order to permit of a low brake cylinder pressure being obtained in the beginning of brake applications; or to reduce the auxiliary reservoir volume so that the proportion of the auxiliary reservoir and brake cylinder will be such that a low brake cylinder pressure will be possible.

If it is impossible to maintain the piston travel sufficiently long to provide for brake flexibility and brake shoe clearance, on account of the action of automatic slack adjusters or excessive false piston travel, it would be necessary in the former case to move the slack adjuster connection towards the nonpressure brake cylinder head to provide the desired increased travel. In the latter case it would be necessary to provide additional movement for the brake piston before striking the nonpressure cylinder head.

If existing types of brake operating equipment are to be maintained intact, the foundation brake gear must of necessity be modified, and any change in this direction should contemplate a brake gear that will provide the minimum of false piston travel and the maximum of effectiveness and convenience, and economy for maintenance.

It is necessary that we depart from the practice of heavy service brake applications, regardless of the train's speed, and that instead of applying the brakes to their maximum in one continuous reduction, the reduction should be made so that the brake application will be gradually produced. For pneumatic operation, the brake application should be timed automatically so that the engineer is able to build up the brake cylinder pressure at a certain rate to some predetermined point in the application, and that this rate be dependent upon the operating conditions obtaining for any particular railroad. Any modification of the service brake does not necessarily involve the emergency brake, so that its effectiveness need not be disturbed. Modifying the service brake by increasing the brake cylinder volume, or by reducing the reservoir volume, can be compensated for by increasing the brake pipe pressure so that the stopping distance would remain the same.

Where the single shoe type of foundation brake gear is in common use and it is the practice to run the piston travel short, necessary shoe clearance is not obtained, with the result that a great many brake shoes are rubbing the wheels very hard when the brakes are released. This increases the difficulty of starting the trains. Increasing the piston travel to provide more flexibility for the service brake, automatically increases the shoe clearance and reduces the difficulty of starting, with a consequent reduction in slack action and also a reduction in the power necessary to start and propel the train. Increasing the piston travel to provide more flexibility for the service brake, also automatically reduces the difficulty of releasing brakes, because it necessitates slightly heavier applications to produce effective braking power.

What Is the Safe Life of an Air Brake Hose?

At the 1917 convention, your committee was instructed to continue their investigation. For the 1918 report we decided to turn our attention to the matter of porous hose, with a view to determining about the average term of service of hose that might be found porous.

The committee obtained records of 25,000 air hose in service. These were inspected in five different groups.

If we accept 25,000 hose as a sufficient number upon which to base a set of averages for the country at large, we may expect to find porous 18.1 per cent of all hose in service, as that is the average percentage of hose found porous from the number of hose inspected.

No data was collected this year covering burst hose, nor did we figure the average length of time in service of those non-porous which we inspected; but did find, as was found last year, that the average life of the air hose still in service was considerably less than those which were found burst or porous, this being due to the fact that hose inspected did not burst until they were in service an average of 28½ months, and might reasonably be expected to burst at any time after that length of service. We find, however, that comparing the average life of the porous hose as of this year with the average life of burst hose as inspected last year, there is only a difference of two tenths of a month in the average life.

Every member is well aware of the detrimental effect of brake pipe leakage, but it is possible that each of us may not give due weight to the effect that a few porous hose in a train may have. In order to determine that, one of the committee caused five trains to be tested for leakage, inspected for porous hose, and again tested for leakage, after the porous hose were removed. The train in each case consisted of 65 cars, and therefore, represented 132 hose, exclusive of those between the engine and tender. The results are shown in Table I.

Table I—Effect of Porous Hose on Brake Pipe Leakage

Train No.	Leakage per min. before testing	No. hose found porous	Percent of hose porous	Leakage per min. after removing porous hose
1	15 lb.	6	4.55	7 lb.
2	18 lb.	5	3.79	8 lb.
3	20 lb.	8	6.06	6 lb.
4	12 lb.	6	4.55	6 lb.
5	14 lb.	7	5.30	7 lb.

It will be seen from the foregoing that a vast improvement is brought about by inspecting these trains for and removing porous hose, and yet the average number found porous in five trains was only 4.85 per cent. When we remember that of all hose inspected, the general average found porous was about 18 per cent, we may begin to realize the handicap under which our enginemen, as well as our inspectors, are working, and also the out-bound terminal delay due to inaudible brake pipe leakage in the porous hose.

The committee urgently recommends that the various railroads put into effect, when weather permits, a system of inspection and soap suds tests at least on repair tracks, for the purpose of detecting and removing from service all porous hose.

The benefit to be derived from this was quite noticeable on one of the railway lines on which data was collected, where the soap suds test system was inaugurated on repair tracks about the time we began collecting data. It was found that while the percentage of porous hose ran very high at the beginning, it gradually lessened until within two

months it was reduced to such a point that only two per cent of the hose tested were found porous. It was also noticed that out-bound terminal air brake delays decreased.

While the cost of removing hose at the expiration of 28 or 30 months means the expenditure of a large sum, we believe that the additional cost will be offset many times by the decreased out-bound terminal air brake delay and by the increased flexibility of train control, the greater train safety and less damage to the equipment due to air brake manipulation. In order to lengthen the life of air brake hose, the railroads must do one of three things: either put into effect a rule which will cause the hose to be parted by hand, buy a guaranteed hose from the manufacturer, or take up the use of properly constructed braided hose.

Abstracts of the remainder of the papers and committee reports will be given in next week's issue.

A list of the companies having exhibits at the convention, together with a brief statement as to the character of the exhibit, and the names of their representatives present, will be found in the General News Section of this issue.

Welding Cast Iron With the Electric Arc

Work Done By New York Central Methods Indicates That No Break Is Too Complicated for Repair

GREAT ECONOMIES are being effected in railroad repair shops because it is now possible successfully to repair iron castings damaged from various causes. Heretofore, expensive castings were scrapped because it was not possible to patch them up in a satisfactory manner. Probably the most important phase of this work as applied to steam locomotives is the welding of cylinders. These castings cost in the neighborhood of $1,000 and in the past it was often necessary to hold an engine in the shop for months

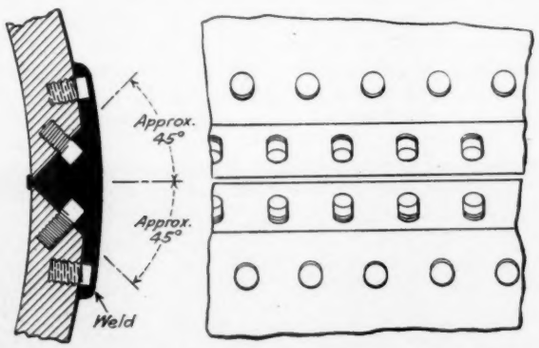


Fig. 1—Section to Be Welded Is "V'd" Out with an Air Chisel and Studs Are Placed in Staggered Rows

while the old casting was taken out and a new one obtained and substituted. Now a broken cylinder can be patched satisfactorily by the electric arc, the work costing from $50 to $100, and the locomotive can be released in a few days. Thousands of dollars are saved annually in large locomotive shops, as it is possible with the electric arc to repair castings in place.

The experience of shop men on the New York Central who are interested in welding, proves that it is possible to weld satisfactorily any cast iron material over ¼ in. in thickness and that no break is too complicated for repair. There are, of course, breaks which are too complicated to weld economically, but there are few such breaks and it is possible to repair any of them. Furthermore, if the proper method be used and proper care be taken in the work, the strength of the weld will be greater than that of the original material.

Preparation of Material for Weld

The material adjoining the fracture is "V'd" out with an air chisel to an angle of about 45 deg. as shown in Fig. 1. Where strength is required, steel studs are placed in the material to be welded in staggered formation as shown in the same illustration. The space which is "V'd" out is then filled up by the metal electrode process, and additional metal is laid over the top of the joint, covering the upper and lower row of studs. This additional metal is known as the "pad."

If the weld does not require strength, it is necessary only to "V" out the sections to be welded, and fill in with the metal electrode until the surfaces are flush. The tensile strength of a section in which steel is applied to a cast iron surface, is, however, only about 5,000 lb. per square in. Usually it is desirable to have the ultimate strength of the weld as much or more than that of the original casting. For this reason, the studs are used, as mentioned in the preceding paragraph.

The required size of these studs, and the manner of placing them, is a subject which has caused a large amount of discussion. Until the welder has become experienced, however, a good method to follow is the one shown in Fig. 1,

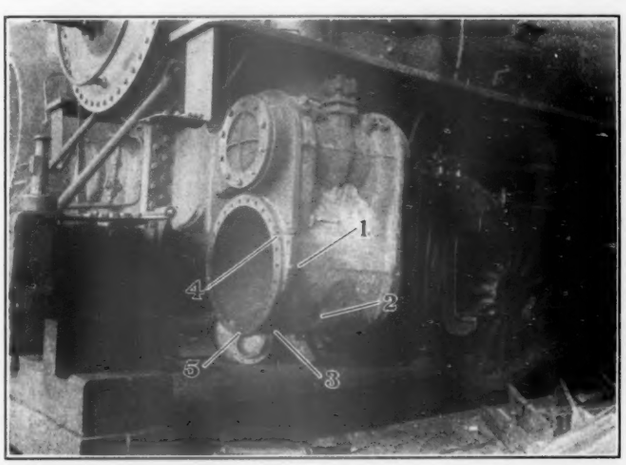


Fig. 2—Triangular Section Replaced in Cylinder by Metal Electrode Process

using studs of such a size, and with such a spacing that the strength of the metal in the studs alone will be equal to, or greater than the ultimate tensile strength of the casting.

Best practice in studding, as used by the New York Central, is shown in Fig. 6. It will be noticed that the studs in the "V" are smaller than those outside. An example of the practice used is to place ⅝ in. studs in the "V" of a fracture with 1 in. thickness and ¾ in. studs outside of the "V" in the pad of the weld.

A comparative simple cylinder repair is shown in Fig. 2.

In this illustration the section 4-2-5 was broken out of a cylinder. Most of the broken section was in small pieces, but the flange 4-5 was intact. The first part of the operation was to replace this flange, and weld it into position. This left a triangular hole, 1-2-3. A piece of wrought iron was cut and rolled to fit this triangle. The outer edges of the wrought iron were beveled, and the inner edges of the hole in the cylinder was beveled and studded with mild steel studs. The wrought iron patch was then clamped in place temporarily, while the weld was "tacked" at several points. The clamps were removed, and the weld completed. The reasons for using wrought iron for the patch are that wrought

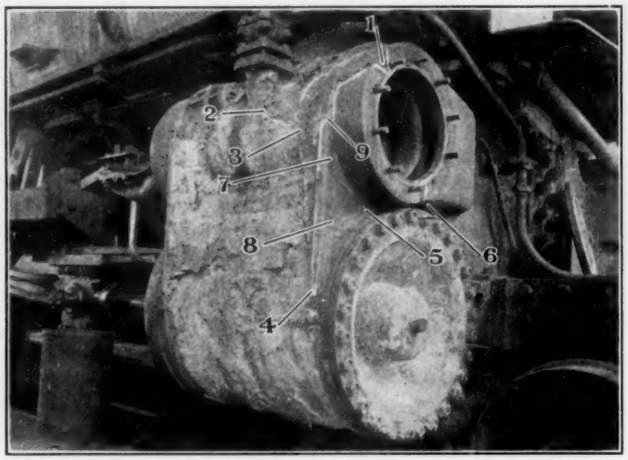


Fig. 3—A Badly Broken Casting Which Taxed the Ingenuity of the Welder

iron is easily cut and shaped to fit such a break, and that it is not necessary to place studs in the wrought iron in order to make a perfect weld. The thickness of metal in the wrought iron patch is equal to the thickness of the original casting. A much more complicated cylinder fracture is shown

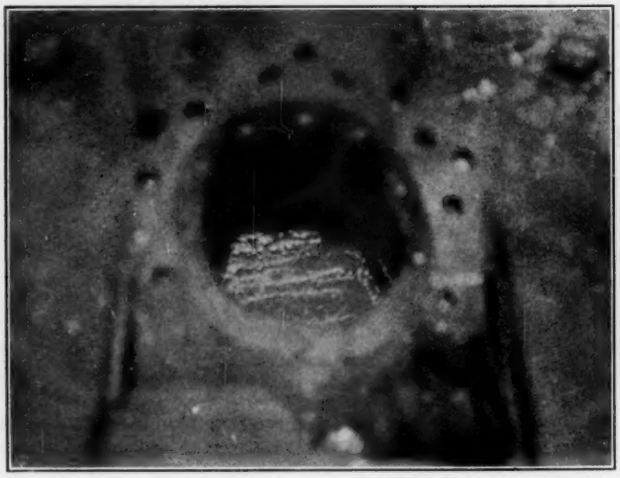


Fig. 4—Hole Cut in Valve Chest with the Oxy-Acetylene Torch. Metal Surrounding the Hole Has Been Drilled and Tapped for Studs, and Metal Shown Under the Hole Has Been Repaired with the Electric Arc

in Fig. 3. The parts broken out were the section 1-2-3-4-5-6. The flange 1-6 was found intact, and was "V'd" out and welded into position. A straight piece 4-9 was made, and secured to the body of cylinder and valve casting with long studs. The section 1-2-3-4-9 was then built up by the metal electrode process. This left the triangular hole 5-7-8. A piece of wrought iron was cut out to approximately fit this hole and welded into position, in exactly the same way as the wrought iron was welded into the first cylinder described.

A unique application of welding is shown in Figs. 4 and 5. Fractures developed in the valve ports at about mid

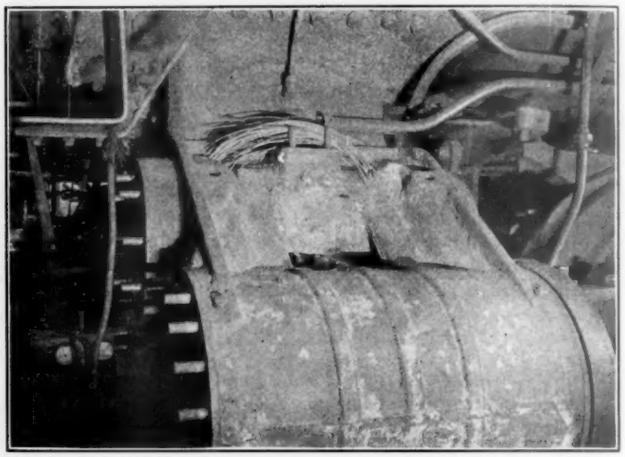


Fig. 5—The Hole Shown in Fig. 4 Has Been Closed With a Piece of Wrought Iron Welded in Place with the Electric Arc

position in the valve. It was impossible to reach the fracture through the head of the valve cylinder, so a circular piece was cut out of the side of the valve chamber with an oxy-acetylene torch as shown in Fig. 4. This made it a comparatively simple matter to get at the broken parts and repair them with the arc. A piece of wrought iron with beveled edges was cut to approximately fill the hole, the

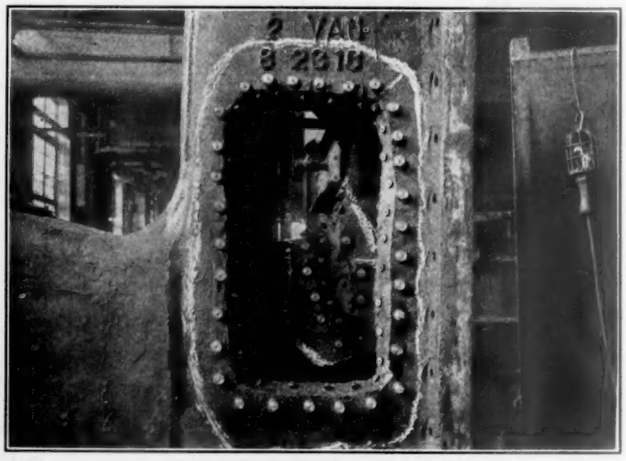


Fig. 6—The Four Sides of This Cylinder Saddle Were Cut Out to Permit the Repair of the Exhaust Passage. One and One-Quarter-Inch Boiler Plate and the Electric Arc Made the Saddle as Good as New

sides of the hole were beveled and studded, and the wrought iron plate welded into position with the metal electrode as shown in Fig. 5.

One locomotive was brought into the shop with the exhaust passage broken inside the cylinder saddle. In order to repair the break, it was necessary to get at it from all four sides. Accordingly, a large opening was cut in each of the four sides of the saddle with an oxy-acetylene cutting torch. The crack in the exhaust passage was "V'd" out and studded, and the edges of the holes cut in the side of the cylinder saddle were beveled and studded, as shown in Fig.

6. The operator then welded the break in the passage by working through the holes cut in the saddle. After the break had been repaired, the holes in the saddle were closed and welded. Pieces of 1¼ in. boiler plate were used to replace the metal taken out on the four sides of the saddle. This operation supplies conclusive evidence to show that the possibilities of electric arc welding, in connection with the welding of cast iron, are practically unlimited.

General Foreman McAllister, of the West Albany shops, has made a special study of cast iron welding, and his capability in this respect has been recognized, as he was one of the committee appointed by former Collector Malone to report on the method of handling repairs on the interned German ships. It is now a well-known fact that the use of the electric arc in repairing these ships greatly facilitated getting them into service quickly at a minimum cost. Work which ordinarily would have taken over a year was finished in two or three months. In connection with the work at West Albany, Mr. McAllister says that even though the cost of materials has increased over 100 per cent and labor has made an advance of from 50 to 100 per cent during the past two or three years, the cost per locomotive mile for repairs has remained approximately constant. This is due altogether to shop economies, the most important of which is the use of electric arc welding.

Safety-First and the Golden Rule

ON THE DETROIT DIVISION of the Pere Marquette, the Safety-First Committee consists of the trainmasters, the division engineer, the master mechanic, the road foreman of engines, the chief despatcher, the general yardmasters, the agents at Detroit and Lansing and foremen, clerks and others to the number of 19 in all; and each one of these men is required to constitute himself chairman of another committee consisting, besides himself, as chairman, of employees who have broken some rule. Once on this committee, a member is required to explain how the violation of the rule happened to occur, and to consider what the consequences might have been. Membership in the committee lasts until such time as a new violation of the rules occurs, when the oldest member retires, making way for the new man. In this way, the committee becomes a sort of endless chain. This creates a rivalry among the men and has the effect of putting them on their guard against infractions of the rules, to the end that they may escape the duties and obligations of the committee work.

J. J. Corcoran, superintendent of this division, issues educational bulletins whenever a suitable occasion offers, not waiting until some bad accident occurs. Bulletin No. 39, dated December 31 and reprinted in the Pere Marquette Magazine for February, takes for its text the butting collision of passenger trains at North Vernon, Indiana, on December 29. It says, in part:

"It is indeed unfortunate that this bulletin is on the same subject as the preceding number, but it is fortunate that the affair is not credited to our railroad. The cause is said to be the east-bound train disregarding orders. Now, let us draw a parallel with our division, and then ask ourselves a few questions. . . . I am just wondering what respect was given the automatic signals. Were the train orders handled as they should have been? We have known of cases where the rules were not followed, in so far as properly reading the orders is prescribed. Was the intermediate preventive overlooked in this case; that is, the conductor with the air signal notifying the engineer that they had a meeting point at the next stop? How were the automatic signals respected? Perhaps if any one of the three points mentioned had been literally lived up to, this accident could have been avoided."

And the bulletin goes on to give, says the Pere Marquette Magazine, some "Golden Rule admonitions" to conductors, enginemen and others to ponder lessons of this kind without waiting for a disaster to occur on their own division. The magazine gives quotations from other bulletins embodying the Christian doctrine of the golden rule. Some of these are:

No. 1, to trainmasters:

"It is exasperating to read the numerous reports which have been received covering damaged switch points, stands and connecting rods on account of switches being run through. We must take action to have this kind of work discontinued. Speedy investigations should be conducted. It is not necessary that they be long drawn-out affairs, taking up a lot of your time. Hustle each one of the cases to a conclusion and mete out the discipline you think is warranted.

"Cold weather is now on and naturally the men are bundled up in heavy wearing apparel and enginemen should understand that men handling switches cannot be as active as when free from burdensome clothing. . . .

No. 2:—"Of course, all of you gentlemen are familiar with the very bad accident which happened on a railroad other than the Pere Marquette, between a steam railway movement and a street car. Several months ago we had several cases where a number of street cars at crossings were not handled just as they should have been. Each of you will, of course, continue your vigilant observation and research into the conduct of all employees located there. . . . The division engineer will please have his supervisor and section foreman report anything which in their judgment is irregular. The signal engineer, the trainmaster and road foremen will handle this with train and enginemen and yardmasters. . . . I personally canvassed each point myself and find that they are being handled properly at the present time; eternal vigilance, without question, keeps us out of irregularities better than anything else."

No. 3:—"I understand that on some divisions where electric blocks are in operation it has been the practice where one train followed another closely instead of remaining back until the blocks cleared and permitted them to go, they put a flagman on the preceding train.

"I would like to know if anything like this could be happening on this division. We cannot be too severe on these fellows who wilfully disregard such rules. Do not hesitate to take decisive and severe action with anyone you find violating these rules."

No. 4:—"I cannot resist from appealing to all that we should have uniform railroading. We seem to be satisfied with semi-annual house cleaning periods—spring and fall. During each of those two periods a thorough renovation is made and the untidy housekeeper just thinks there is nothing further to be done until the next regular house cleaning period, but it is in the interim that her troubles accumulate.

"It is so with railroads. The supervision gets lax and a lot of accidents occur and then everybody starts housecleaning. They get on their toes and harp about compliance with the rules; and finally straighten out and go along as they should for a short time; but we gradually forget what has gone before and matters get back into the old rut and we let a lot of little troubles accumulate without any action being taken until finally we run into another epidemic of accidents and then comes another housecleaning.

"But what I am hammering at is to keep cleaning all the time; and by that I mean vigilance and observance of the rules. Frankly, I think we are keeping our house pretty clean, but let us continue to do so.

"What is your answer to this?"

Further, says the editor of the magazine, Mr. Corcoran has successfully handled the trying problems of the Detroit division with practically the same set of employees that surrounded his less successful predecessors.

General News Department

A free school for instruction in telegraphy has been opened by the Boston & Albany at Springfield, Mass.

The wheel and axle warehouse of the Louisville & Nashville, at Louisville, Ky., was destroyed by fire on May 2; estimated loss, $125,000.

The freight house of the Baltimore & Ohio at Braddock, Pa., together with a storehouse containing unclaimed freight, was destroyed by fire on May 1; estimated loss on real estate, $35,000, and on merchandise, $75,000; total, $110,000.

The Texas Short Line railroads have sent a deputation, accompanied by the chairman of the State Railroad Commission, to the railroad administration at Washington, asking special consideration of the Texas short line railroad situation.

On the dining cars of the Erie Railroad the prices of meals are now fixed, and a la carte rates have been discontinued. The price for a dinner is $1 and for a breakfast or luncheon 75 cents. To members of the military and naval forces, in uniform, the rate is 75 cents uniformly, morning, noon and night.

The Ozark Valley Railway, a 35-mile line extending from Williamsville, Mo., northward to Cascade, has been sold for junk to the Bender Iron & Supply Company, Shreveport, La., subject to the confirmation of the United States district court, under which the road has been operated by G. A. Long, receiver.

The Atchison, Topeka & Santa Fe has applied to the Kansas Public Utilities Commission for authority to take up the track of its line between Wellington and Caldwell, a distance of about 20 miles. This line has not been used for several years, trains being run over the parallel line of the Chicago, Rock Island & Pacific.

The annual meeting of the Western Railway Club will be held at the Hotel Sherman, May 20, the informal banquet being held in the Italian room at 6:30 P. M. and meeting in the Louis XVI room at 8 P. M. The principal speaker of the evening will be professor H. G. Moulton, of the department of political economy, University of Chicago, who will speak on "The Business Side of the War." The Memorial Committee will present resolutions on the death of Joseph Taylor, the late secretary of the club. There will be the usual annual meeting and election of officers.

The Division of Valuation of the Interstate Commerce Commission wants senior electrical engineers, grade 2; junior civil engineers, grade 1; and junior engineers in the same grade for the electrical, mechanical, signal, structural, telegraph and telephone departments; also junior architects. Candidates for senior electrical engineer will have their applications considered on June 18, while those for the other offices named will be taken up at any time, regardless of date. The salaries for the first named office will range from $1,800 to $2,700; and for the other places, from $1,320 to $1,680.

The Chicago council committee on track elevation went to Washington this week to confer with the director general of railroads on the subject of railroad track elevation work in Chicago during the war. The committee wishes to determine whether the prosecution of the war demands the total or partial discontinuance of elevation work in the city. The committee carried with it statistics prepared by the coroner showing the number of persons killed and injured at grade crossings in the city in 1916 and 1917. Solon Gold, engineer of track elevation for the city, accompanied the committee to Washington.

The stationary storehouse of the New York, New Haven & Hartford, at New Haven, Conn., was destroyed by fire on May 9; estimated loss, including contents of building and freight and passenger cars, $80,000. On the day before, Wednesday, the passenger station of this road at New Haven was gutted by fire and practically ruined. This building was used mostly for offices, as some months previously a temporary wooden station was put in use preparatory to the construction of a new passenger station a short distance west of the present location. The burned station was of brick, three stories high, built in about 1871 and rebuilt in 1891 after the fire of that year.

M. C. B. and M. M. Associations

The Executive Committees of the Master Car Builders' and the Master Mechanics' Association, at a joint meeting held in Chicago on May 13, elected V. R. Hawthorne secretary of both associations, to fill temporarily the vacancy caused by the death of Joseph W. Taylor. Mr. Hawthorne was formerly in the service of the Pennsylvania Railroad, but for the past year has been engaged in work for the American Railway Association.

Vestibuled Cabs

The New York legislature has passed a law requiring all new locomotives which shall be put in service after this year (1918) and all taken into the shop after January 1, next, for general repairs, to be equipped with "vestibuled" cabs, so constructed as "to attach to the sides of and inclose all openings between the engine cab and the tender." The New York law requiring power-operated fire-box doors on locomotives goes into effect on the same date on all new locomotives placed in service after January 1, next, and locomotives now in service must be equipped with vestibules the next time they are withdrawn for "generally heavy repairs," after the act becomes effective next January.

Fuel Consumption by Railroads in 1917

The Geological Survey reports that the immense increase in railroad traffic has increased correspondingly the quantity of petroleum consumed as locomotive fuel in 1917, despite the mounting cost and growing scarcity. Statistics compiled from reports submitted by all railroad companies that operated oil-burning locomotives in the United States show that the quantity of fuel oil consumed by them in 1917 was 45,707,082 barrels, or 8.5 per cent over 1916 and a larger consumption than in any other year.

The total distance covered by oil-burning engines in 1917 was 146,997,144 miles, and the average distance covered per barrel of fuel consumed was 3.2 miles. Oil-burning locomotives were run on 32,431 miles of road in 21 States.

Western Roads Will Use Government Employment Agencies

Railroads under the authority of the Western regional director have agreed to discontinue the use of employment agencies conducted for profit and to obtain their track labor exclusively through the United States employment service. The carriers' own free labor agencies are to be continued as branches of the United States free employment service. The employees of these agencies will be appointed examiners in the Federal service at one dollar a year, and will continue to receive their regular compensation from the railroads. Those agencies operating labor camps under contracts with railroads have similarly been taken over by the United States employment service. Although private labor agencies will no longer be used by the roads, the United States employment service is taking over many of the best operatives of these organizations. In Chicago alone 20 employees of labor agencies have joined the United States employment service and in Omaha four have been employed.

The plan for recruiting track labor under the new arrangement has been worked out by Dr. P. L. Prentis, superintendent of District 7 of the United States employment service, with head-

quarters at Chicago, and W. G. Bierd, chairman of the Chicago Railroad Presidents' Committee, who is the representative of R. H. Aishton, regional director. Several railroad officers with practical experience in employing laborers have assisted them in this work. Dr. Prentis and the superintendents of the other districts of the United States employment service in the western railroad region will supervise the recruiting of track labor in their respective territories, in co-operation with the existing organizations maintained by the railroads. Each superintendent will aim to supply the labor demand in his own territory and in case he secures an excess will turn over the surplus to adjoining districts in need of men.

Railroad men with experience in handling laborers believe that this plan of distributing men is practicable only within certain limits. They point out that the hobo class of labor is of a roving disposition and accustomed to making long trips from points where they have wintered before they are willing to settle down and do any work. It is also pointed out that the maximum wage of $2.75 for terminal points and $2.50 a day for points on the line, recently established by the Railroad Administration for western lines, is not sufficient to attract men. The recent recommendations of the Railway Wage Commission are based upon conditions in December, 1915, when track laborers received from $1.65 to $1.75 a day, so that the 43 per cent increase recommended will only raise the track laborer's wage to from $2.35 to $2.50 a day, or less than the maximum wage recently established for railroads in western territory. While it is probable that wages will have to be increased above this maximum, it is pointed out that it is not necessary to raise the compensation for track labor to the standards obtaining in war industries, as there is an attraction about track work which induces men who have had experience on railroads to work at less pay than is offered in other industries, provided the pay is sufficient to supply them with the necessaries and the pleasures which they are used to.

The Overman Bill

The Overman bill, authorizing the President to reorganize the executive departments of the government, was passed by the House of Representatives on Tuesday of this week, and has been sent to the President. The amendment to except the Interstate Commerce Commission from this law was rejected in the House by a vote of 213 to 7. In the debate on the bill, Chairman Webb, of the Judiciary Committee, said that President Wilson had told him that he had no intention of taking away the functions of the Interstate Commerce Commission, especially such functions as the power of the commission to review freight and passenger rates, as conferred by the railroad control bill; but the President said that he could make use of many employees and experts of the Interstate Commerce Commission in other departments of government work.

Inefficiency of the Post Office Department

The Merchants' Association of New York city, acting on a voluminous report made by a committee, after five months' investigation, has presented to Congress a memorial calling for the appointment of a joint committee to make a comprehensive investigation of the present methods of the Post Office Department. These methods have resulted in serious delays throughout the country. The investigating committee finds that about 44 per cent of the railroad lines formerly served by railway postal cars, have been wholly or partly deprived of the advantages of that service, and that economizing space in cars, to reduce the cost of transportation, is constantly causing unreasonable delays. The investigating committee finds that mails are not despatched with former frequency; that they are not fully worked in transit; and that train delays are not a principal cause of slowness in the mails.

Society for Testing Materials

The twenty-first annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on June 25, 26, 27 and 28. Wednesday afternoon, the 26th, will be devoted to topical discussions on Co-operation in Industrial Research, while the evening session on Thursday will be a joint meeting with the American Concrete Institute. The annual golf tournament will be held on Thursday afternoon.

Bugs Stop Train

A freight train on the Chicago, Burlington & Quincy was stalled on May 7 near Stockholm, Wis., when it ran into an immense cloud of shad flies. The crushed bodies of the insects lubricated the tracks to such an extent that the driving wheels slipped. It was necessary to clean the rails before the locomotive could make headway.

Miss Phœbe's Finish?

Should McAdoo
Miss Snow Taboo
And veil her face from human view,
In Memory's light
She'd still shine bright
Along the Road of Anthracite.

—J. B. G., in *New York Tribune.*

Wooden Passenger Cars Passing Out of Service

In order to ascertain the progress of the building of steel and steel underframe passenger train cars and to develop the cost of reconstruction in steel of the present wooden equipment of the country the Special Committee on Relations of Railroad Operation to Legislation sent certain requests to the carriers on January 2, 1918. Replies were received from 434 roads operating 246,224 miles in the United States and 64,816 passenger train vehicles, and with 966 under construction on January 1. Replies were also received from eight companies operating 33,269 miles in Canada, with 5,422 passenger train vehicles, and with 35 under construction on the same date. Estimates and percentages in the tables apply only to cars operated by roads in the United States.

It will be noted that there were but five wooden passenger train cars constructed in 1917 and that but 27 such wooden cars were under construction on January 1, 1918, indicating that the building of wooden passenger train cars has practically ceased.

ANNUAL ADDITIONS OF PASSENGER EQUIPMENT.

		Percentages		
Acquired in	Total number	Steel	Steel underframe	Wood
1909	1,880	26.0	22.6	51.4
1910	3,638	55.4	14.8	29.8
1911	3,756	59.0	20.3	20.7
1912	2,660	68.7	20.9*	10.4
1913	3,350	63.0	30.4*	6.6
1914	4,495	74.6	29.9*	4.5
1915	1,696	73.7	20.1*	6.2
1916	1,445	92.5	7.3*	.2
1917	2,780	62.5	37.3*	.2
January 1, 1918 (under construction)	966	90.8	6.4	2.8

*This figure includes wooden cars reconstructed with steel underframe.

The rapid increase in steel and steel underframe cars is shown below:

Approximately in service	Steel	Steel underframe
January 1, 1909	629	673
January 1, 1910	1,117	1,098
January 1, 1911	3,133	1,636
January 1, 1912	5,347	2,399
January 1, 1913	7,271	3,296
January 1, 1914	9,492	4,608
January 1, 1915	12,900	5,700
January 1, 1916	14,286	6,060
January 1, 1917	15,754	6,136
January 1, 1918	17,601	8,339
Increase 1918 over 1909	16,972	7,666
Increase 1918 over 1909	2,698%	1,139%
Increase 1918 over 1917	11.7%	35.9%

The number of wooden cars in service on January 1, 1912, was 48,126. There are now in service approximately 38,876, indicating the retirement from service of 9,250 cars in six years.

APPROXIMATE COST OF REPLACEMENT OF WOODEN CARS WITH CARS OF STEEL

	Number	Average cost*	Amount
Postal	158	$19,000	$3,002,000
Mail and baggage	2,236	17,500	39,130,000
Mail, baggage and passenger	572	17,500	10,010,000
Baggage and passenger	3,205	17,500	56,087,500
Baggage or express	6,998	14,800	103,570,400
Passenger	20,727	23,000	476,721,000
Parlor, sleeping, dining	3,978	37,000	147,186,000
Business	726	26,000	18,876,000
Motor	276	35,000	9,660,000
Total	38,876		$864,242,900
Annual interest charge at 5 per cent			$43,212,145

*The cost figure is the same as used a year ago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1918

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Atch., Top. & Santa Fe	8,641	$7,149,511	$2,542,169	$10,540,240	$1,309,007	$2,042,537	$153,725	$3,913,750	$233,542	$7,641,424	72.50	$2,898,816	$557,161	$2,341,112	—$980,884
Balto. & Ohio	4,948	6,498,307	1,502,934	8,976,321	1,347,707	2,793,224	175,054	5,150,215	281,899	9,803,787	109.22	—827,466	411,104	—1,240,909	—2,727,765
Cumberland Valley	163	215,462	51,943	290,143	29,728	40,815	5,576	121,021	10,521	208,376	71.82	81,767	7,358	74,408	—61,369
El Paso & Southwestern	1,028	960,616	213,320	1,228,641	107,855	144,934	18,102	338,447	32,853	650,038	52.91	578,603	50,985	527,604	—35,259
Fla. East Coast	764	378,316	336,253	828,647	70,198	95,017	22,674	244,391	7,785	433,993	52.37	394,654	38,226	356,245	—126,303
Ft. Worth & Rio Grande	235	83,728	25,263	116,837	20,521	21,422	1,549	38,160	4,065	85,716	73.36	31,121	3,078	27,678	34,019
Grand Rapids & Ind.	569	299,680	90,428	432,077	70,824	101,003	8,513	231,392	16,581	428,637	99.20	3,440	22,929	—19,723	13,828
Gulf Colo. & Santa Fe	1,937	1,004,569	344,886	1,442,759	240,464	232,118	24,348	490,339	56,125	1,039,349	72.04	403,410	69,193	333,719	164,556
Ill. Cent.	4,765	5,355,340	1,338,746	7,210,449	1,073,486	1,532,623	85,768	2,951,635	189,490	5,851,634	81.15	1,358,814	395,762	957,803	—363,877
Kans. City Sou.	774	938,184	155,221	1,173,221	90,194	174,863	21,737	421,317	35,027	742,894	63.32	430,327	56,986	373,305	55,235
Lehigh Valley	1,446	2,632,554	314,814	3,257,889	399,508	883,791	71,615	2,161,598	95,212	3,622,573	111.19	—364,684	161,471	—526,198	—587,070
Newburgh & South Shore R. R. Co.	15	.....	—243	57,682	9,005	20,678	.....	40,924	3,948	74,556	129.25	—16,874	4,653	—21,527	—11,239
Ore. Short Line	2,306	1,447,177	424,246	2,042,704	301,796	323,223	28,813	669,501	81,079	1,442,651	70.62	600,052	157,754	442,137	—3,187
Ore. Wash. R. R. & Nav. Co.	2,065	894,616	436,312	1,489,869	336,362	220,263	37,380	659,936	81,627	1,352,126	91.77	137,742	123,754	13,900	—190,572
Panhandle & Santa Fe	709	326,642	94,989	442,971	56,999	93,996	4,301	152,972	13,237	321,297	72.53	121,674	17,432	104,242	—65,056
Penn. Co.	1,754	3,209,143	885,118	4,626,354	959,035	1,421,939	95,857	2,778,264	159,336	5,437,635	117.54	—811,281	285,339	—1,096,666	628,792
Pits., Cin., Chgo. & St. Louis	2,398	3,349,879	930,367	4,905,695	756,836	1,334,218	90,421	2,590,073	150,196	4,973,092	101.37	—67,397	229,621	—297,045	767,984
Pitts., Shawmut & Northern	204	90,260	5,759	97,867	19,892	41,352	1,267	67,573	8,500	138,584	141.60	—40,717	1,790	—42,507	—33,369
St. L., San Francisco & Tex.	143	108,935	8,862	122,932	17,204	22,281	2,447	45,567	7,355	94,854	77.16	28,078	1,648	26,244	15,430
Union Pac.	3,630	3,892,514	1,054,218	5,523,305	703,314	1,035,414	85,304	1,889,731	188,999	4,038,832	73.12	1,484,473	288,642	1,195,677	263,946
Yazoo Miss. Valley	1,381	1,125,695	323,822	1,511,963	220,127	299,690	17,726	533,377	41,306	1,110,563	73.45	401,400	61,528	339,836	71,265
MONTH OF MARCH, 1918															
Ala. Vicks.	141	$127,538	$45,846	$191,878	$16,821	$31,939	$5,829	$72,563	$6,094	$134,635	70.17	$57,243	$10,500	$46,743	$6,720
Ann Arbor	293	212,766	37,412	267,267	44,159	43,616	4,750	110,996	8,578	212,672	79.57	54,594	13,000	41,477	43,843
Atch., Top. & Santa Fe	8,641	8,645,451	2,809,443	12,395,100	1,545,840	2,304,707	180,818	4,167,607	248,558	8,398,824	67.76	3,996,276	556,882	3,438,471	—901,598
Atlantic & St. Lawrence	166	143,876	18,908	173,066	27,085	47,249	3,163	151,552	5,336	180,215	104.13	—7,149	11,346	—18,496	39,697
Atlantic City	170	106,173	103,499	223,298	29,958	26,643	1,466	124,613	2,917	185,677	83.15	37,620	12,000	25,620	26,128
Atlantic Coast Line	4,785	3,045,010	1,313,105	4,690,707	459,693	723,758	59,062	1,708,225	97,172	3,072,330	65.50	1,618,337	160,000	1,457,872	9,961
Balto. & Ohio Chicago Terminal	79	.....	498	160,469	21,415	45,387	1,100	106,455	8,671	185,084	115.34	—24,615	31,376	—56,993	—42,766
Bangor & Aroostock	632	353,595	65,909	436,908	57,097	76,456	3,001	161,062	11,410	313,269	71.70	123,639	17,735	105,892	—46,931
Beaumont, Sour Lake & West	118	103,033	34,541	141,898	13,201	14,385	2,281	43,791	4,597	78,256	55.15	63,641	2,150	61,459	45,093
Belt Ry. Co. of Chic.	31	.....	.....	350,435	29,562	55,371	476	183,714	7,442	276,567	78.92	23,868	13,898	59,970	—16,800
Bessemer & Lake Erie	208	593,002	32,974	645,697	140,525	228,684	10,268	277,456	22,834	645,861	100.01	—165	19,700	—19,866	—108,900
Bingham & Garfield	36	246,030	4,281	255,584	33,498	44,962	1,413	47,273	2,874	133,423	52.20	122,160	9,565	112,595	—16,359
Birmingham Sou.	44	97,983	1,238	122,350	12,621	28,484	835	52,530	4,402	98,872	80.81	23,478	3,653	19,825	11,551
Boston & Maine	2,305	3,301,547	1,347,136	5,169,542	617,830	989,074	30,181	2,919,210	135,839	4,720,685	91.32	448,856	182,646	266,210	—286,945
Buff. & Susq. R. R. Corp.	252	183,250	6,164	192,519	29,772	52,343	1,575	86,225	7,128	177,044	91.95	15,475	4,100	11,375	—9,498
Buff., Roch. & Pitts.	584	1,278,250	105,968	1,419,579	175,754	424,262	14,753	579,289	29,110	1,225,215	86.31	194,363	26,734	167,628	—13,698
Canadian Pacific Lines in Maine	233	220,446	25,565	272,178	29,740	63,987	2,069	208,143	2,673	306,612	112.65	—34,435	9,500	—34,934	—170,442
Carolina, Clinchfield & Ohio	282	322,128	36,361	363,162	50,291	66,955	13,306	106,316	15,930	252,198	69.45	110,964	14,800	96,164	—16,653
Central of Georgia	1,918	1,175,399	423,093	1,776,313	230,857	276,380	34,146	594,535	46,928	1,184,882	66.70	591,430	64,386	526,657	210,842
Central of New Jersey	684	2,403,480	542,788	3,198,902	276,773	701,708	19,092	1,499,239	66,566	2,578,016	80.59	620,887	159,435	461,194	—330,775
Central New England	301	433,338	28,065	480,986	70,701	84,598	1,325	207,132	8,346	374,008	77.75	106,976	19,200	87,775	—46,705
Central Vermont	411	292,326	61,095	388,684	42,608	75,304	7,813	237,509	10,939	374,496	96.35	14,188	17,400	—3,220	—39,432
Charleston & West. Carolina	342	195,345	41,785	352,570	31,618	32,120	3,413	97,806	4,293	169,250	48.00	83,320	9,000	74,320	—8,079
Chesapeake & Ohio Lines	2,479	3,967,613	857,356	5,188,751	627,680	1,104,481	49,832	1,817,396	98,469	3,722,948	71.75	1,465,803	145,000	1,320,707	—22,196
Chicago & Alton	1,050	1,347,642	408,013	1,876,521	212,528	410,182	30,617	759,136	37,303	1,460,142	78.34	416,380	58,195	357,927	—76,629
Chic. & East. Ill.	1,131	1,675,730	271,149	2,101,700	232,935	643,511	25,328	794,768	45,112	1,748,837	83.21	352,863	69,730	282,737	—69,563
Chicago & Erie	269	763,948	40,875	870,956	110,965	145,659	15,126	437,974	18,539	229,960	26.41	140,995	47,465	93,500	—83,439
Chicago & Northwestern	8,094	6,527,036	2,025,497	9,406,683	994,211	1,819,459	107,864	4,214,198	193,211	7,380,348	78.46	2,026,335	420,000	1,603,214	—419,696
Chic., Burl. & Quincy	9,373	8,306,070	1,971,649	11,193,853	1,457,443	2,037,474	120,325	4,289,692	253,036	8,262,594	73.81	2,931,259	501,900	2,429,359	—609,238
Chic., Det. & Can. Gd. Trk. Jctn.	60	55,674	6,270	84,002	10,482	18,758	1,362	61,922	2,310	94,834	112.90	—10,832	3,345	—14,176	—24,443
Chic. Great Western	1,496	1,126,653	372,188	1,617,601	158,539	331,324	41,549	633,549	39,550	1,217,093	75.24	400,508	54,974	344,497	65,623
Chic., Ind. & Louisville	659	569,400	176,319	815,314	76,637	183,222	18,048	331,065	19,974	629,920	77.26	185,394	31,537	153,752	—31,323
Chicago Jct.	12	.....	.....	335,699	61,326	29,435	1,285	177,978	6,823	308,675	91.94	27,024	2,553	24,471	—7,628
Chic., Milwaukee & St. Paul	10,303	7,345,783	1,664,671	9,925,215	789,086	2,552,937	123,921	4,229,329	205,850	7,947,992	81.08	1,977,223	516,348	1,424,796	—684,128
Chicago, Peoria & St. Louis	247	165,504	20,846	195,421	25,783	54,760	5,269	93,510	6,105	185,427	95.30	9,993	6,750	3,243	17,839
Chicago, Rock Island & Gulf	474	257,002	76,403	358,832	42,563	47,590	8,684	129,656	9,121	238,877	66.85	119,954	13,155	106,784	8,061
Chicago, Rock Island & Pacific	7,823	5,674,605	2,033,169	8,236,856	898,244	1,717,581	113,740	3,228,321	179,379	6,165,762	74.86	2,071,075	340,542	1,729,112	—256,157
Chic., St. Paul, Minn. & Omaha	1,749	1,365,077	471,144	1,963,193	142,639	327,526	24,482	951,034	46,381	1,506,350	76.73	456,843	101,117	355,224	54,806
Chic., Terre Haute & Southeastern	374	331,964	21,232	361,188	27,229	140,121	4,290	136,884	8,743	320,344	88.69	40,844	18,500	22,571	—45,563
Cin., Ind. & West	419	217,611	40,551	282,738	29,537	57,289	7,360	120,180	8,824	223,350	79.00	59,387	9,141	50,247	11,194
Cin., New Orl. & Tex. Pac.	337	755,701	313,058	1,153,558	85,748	264,929	22,945	474,515	26,521	873,641	75.73	279,917	37,727	242,062	—41,564
Cin. North	245	198,117	14,415	217,133	33,974	57,096	2,955	78,074	4,213	176,061	81.08	41,072	7,267	33,806	17,150
Cleveland, Cin., Chic. & St. Louis	2,387	3,906,420	1,002,925	5,367,638	469,246	930,986	75,286	2,041,671	102,185	3,639,824	67.81	1,727,814	169,447	1,558,624	546,020
Colo. & So.	1,100	741,416	141,080	943,872	100,005	202,470	12,496	349,568	31,518	699,968	74.16	243,904	51,000	192,795	—71,785
Colo. & Wyoming	42	31,162	2,748	93,540	8,695	17,589	119	35,287	4,198	65,888	70.44	27,652	3,000	24,649	—17,000
Cumberland Valley	163	269,095	57,201	356,646	35,148	44,033	3,586	134,076	13,371	230,688	65.68	125,958	9,197	116,698	—62,608
Del. & Hudson Co.—R. R. Dept.	878	2,227,111	185,263	2,547,824	261,128	593,427	21,158	1,242,361	84,500	2,247,836	88.23	299,988	66,640	233,022	216,505
Del., Lackawanna & Western	955	3,163,595	722,262	4,855,763	356,678	926,086	61,008	2,249,473	95,876	3,725,837	77.73	1,129,925	234,661	895,224	—438,029
Denver & Rio Grande	2,557	1,871,655	352,845	2,344,269	204,792	563,365	34,729	781,978	50,973	1,662,673	71.93	681,595	105,000	576,194	—138,319

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1918, CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Denver & Salt Lake	255	$129,992	$22,967	$160,547	$45,594	$63,875	$833	$82,825	$3,464	$196,591	122.45	—$36,044	$9,000	—$45,044	—$4,788
Detroit & Mack	381	95,269	24,324	127,392	14,284	26,021	1,119	53,240	4,827	99,491	78.10	27,900	8,012	19,888	—3,002
Detroit & Toledo Shore Line	80	175,979	.....	178,794	8,400	13,317	1,634	57,748	3,415	84,514	47.38	94,280	10,480	83,800	—5,161
Det., Grand Haven & Milwaukee	190	172,000	37,000	254,140	25,906	68,366	3,943	155,696	7,956	271,866	106.97	—17,726	3,444	—21,180	—43,009
Det., Toledo & Ironton	441	147,190	10,586	173,899	28,425	57,600	2,616	126,829	9,417	234,883	135.07	—60,983	8,500	—69,483	—90,871
Duluth & Iron Range	234	87,620	20,822	121,266	74,939	75,054	771	97,984	11,977	260,725	215.00	—139,459	7,787	—147,246	—4,683
Duluth, Missabe & North	410	114,881	34,971	169,272	130,314	144,650	3,596	120,114	39,810	440,006	259.94	—270,734	13,635	—284,369	—92,327
Duluth, South Shore, Atl	601	229,724	75,722	323,524	61,554	52,763	8,219	174,395	9,414	310,067	9,584	13,457	17,000	—3,543	—84,907
Duluth, Winnipeg & Pacific	175	125,714	27,678	158,829	17,764	22,203	3,068	72,996	5,773	124,391	7,832	34,438	8,122	26,316	—45,458
El Paso & Southwestern Co	1,028	982,803	209.134	1,253,909	115,516	163,727	19,227	539,176	32.905	678,085	54.08	575,823	50,985	524,764	—51,093
Elgin, Joliet & Eastern	804	1,214,970	16	7,447,130	136,346	278,300	6,715	548,937	27,741	997,698	13.40	449,432	50,772	398,659	223,065
Erie	1,989	4,937,779	786,412	6,301,952	804,841	1,813,978	82,210	3,457,096	145,654	6,345,889	100.70	—43,936	236,897	—282,087	—679,055
Florida East Coast	764	527,365	347,887	995,098	76,677	96,352	10,776	266,414	16,184	451,842	45.41	543,256	38,895	503,981	46,474
Ft. Smith & Western R. R. Co	253	79,405	23,147	111,497	16,156	27,268	2,528	41,643	4,717	93,068	83.47	18,428	5,000	13,429	8,686
Ft. Worth & Denver City	454	469,535	140,437	643,974	47,937	111,314	6,094	234,378	19,619	422,157	65.55	221,816	22,021	199,795	61,287
Ft. Worth & Rio Grande Ry. Co	235	48,117	31,143	87,217	14,979	14,668	3,115	39,209	5,655	77,626	89.00	9,591	3,039	6,552	6,498
Galveston, Harrisburgh & San Ant	1,360	1,213,035	419,239	1,734,452	240,332	265,044	34,534	722,270	47,610	1,360,012	79.41	374,440	51,500	322,845	—147,099
Galveston Wharf	13	.....	.....	92,474	1,077	1,010	472	28,485	657	54,038	59.44	38,437	12,300	26,137	—7,298
Georgia	328	315,523	103,979	455,806	38,016	59,414	9,019	202,708	10,574	319,924	70.19	135,882	5,950	129,931	54,696
Ga., Sou. & Fla	402	167,645	87,875	282,928	34,702	54,626	6,291	115,178	10,167	224,100	79.20	58,829	14,232	44,581	13,679
Grand Rapids & Ind	569	410,903	123,956	579,827	73,826	124,513	9,250	253,980	18,111	480,409	82.85	99,418	72,929	76,488	5,447
Grand Trunk Western	347	519,000	141,000	718,424	76,912	257,028	15,442	372,176	21,514	746,758	103.94	—28,334	37,649	—66,063	—158,725
Gulf & Ship Island	307	149,143	45,200	209,770	36,316	30,513	3,390	63,289	10,693	144,273	68.78	65,497	10,368	55,129	17,282
Gulf, Colo. & Santa Fe	1,937	1,149,464	391,786	1,638,455	290,499	220,394	27,511	525,135	49,558	1,112,521	67.90	525,934	76,738	455,045	189,621
Gulf, Mobile & Northern	407	153,786	30,389	193,341	22,802	37,407	5,056	68,686	8,719	142,683	73.80	50,658	13,766	36,893	—1,449
Houston, East & West Texas	190	120,325	37,298	168,260	41,370	7,977	2,123	78,001	3,272	132,733	78.89	35,527	6,140	29,360	34,881
Houston & Texas Central	948	572,982	142,207	775,217	162,171	30,000	13,353	330,779	19,804	575,915	74.29	199,302	33,030	166,098	20,472
Ill. Cent	4,765	6,827,451	1,466,077	8,883,535	1,062,101	1,652,110	76,483	3,214,006	183,300	6,231,376	70.15	2,652,159	432,762	2,218,748	416,665
Ind. Harbor Belt	116	.....	.....	510,184	58,977	98,325	2,073	268,682	11,525	439,581	86.16	70,603	8,987	61,616	—39,769
International & Great Northern	1,159	771,716	291,978	1,150,316	132,662	203,648	19,408	469,536	3,418	857.130	74.51	293,186	30,000	262,365	110,633
Kanawha & Mich	176	275,256	63,022	350,349	53,776	97,774	2,191	106,174	8,406	268,323	76.59	82,025	18,817	63,209	34,573
Kansas City, Mex. & Orient	272	90,869	10,347	106,721	19,006	41,232	4,963	60,307	6,428	131,936	123.63	—25,216	6,250	—31,466	—8,538
Kansas City, Mexico & Orient of Tex	465	85,062	10,137	99,910	16,292	25,376	4,362	52,494	4,379	102,904	103.00	—2,994	5,000	—7,994	—3,522
Kansas City Southern	774	997,056	170,607	1,251,997	108,592	190,722	20,957	461,407	40,389	821,277	65.60	430,720	56,986	373,649	50,872
Lake Erie & West	900	728,904	43,712	806,090	78,381	151,843	12,534	320,059	19,045	581,862	72.18	224,278	25,820	198,348	21,466
Lehigh & Hudson River	96	178,943	3,817	187,364	23,692	36,036	1,346	80,170	4,395	139,638	75.53	47,725	6,000	41,724	—13,549
Lehigh & New Eng	296	282,625	1,465	293,732	34,095	57,605	2,552	108,497	7,461	210,074	71.52	83,658	8,211	75,447	5,026
Lehigh Valley	1,443	3,982,336	391,584	4,739,972	414,745	1,055,343	54,536	2,360,535	87,536	3,983,467	84.04	756,505	161,471	594,652	—259,430
Long Island	398	399,903	872,934	1,412,501	182,032	190,531	9,152	703,927	36,828	1,133,774	80.27	278,727	75,972	202,542	151,298
Louisiana & Arkansas	302	119,147	32,473	157,267	23,692	19,115	3,522	50,467	5,506	102.303	65.05	54,963	10,548	44,491	27,490
Louisiana West	207	235,246	91,742	347,269	52,362	46,104	7,669	82,485	8,523	199,567	57.47	147,703	10,979	136,683	995
Louisville & Nash	5,074	5,813,359	1,609,294	7,846,227	811,580	1,530,762	118,966	2,850,719	131,709	5,453,212	69.50	2,393,015	240,064	2,151,842	578,694
Louisville, Henderson & St. L	199	166,750	47,425	226,217	34,308	22,589	5,801	84,917	4,285	152,352	67.35	73,864	3,931	69,787	1,969
Maine Cent	1,216	774,064	305,115	1,160,808	190,635	224,124	10,456	651,925	31,675	1,108,836	95.52	51,972	68,228	—16,257	—289,590
Maryland, Delaware & Va. Ry. Co	82	53,695	24,008	80,316	4,939	10,739	1,060	50,800	1,870	69,408	88.62	10,909	1,092	9,817	—1,599
Michigan Cent	1,861	3,947,229	1,084,674	5,595,257	568,927	818,694	61,048	2,183,938	84,831	3,779,589	67.55	1,815,668	170,700	1,644,819	910,418
Midland Valley	386	209,664	57,406	277,777	37,510	33,088	2,995	92,147	11,538	177,277	63.82	100,500	7,995	92,493	58,160
Mineral Range	100	82,607	2,729	91,428	14,528	20,904	440	51,981	1,106	88,950	97.30	2,469	3,300	—831	—569
Minn. & St. Louis	1,646	763,138	165,114	977,899	154,156	192,393	16,760	429,236	22,735	815,338	83.38	162,361	47,486	114,115	.....
Minn. & International Ry. Co	195	70,763	25,559	100,199	11,598	11,570	343	39,143	2,867	65,522	65.39	34,677	5,006	29,671	—3,874
Minn., St. Paul & Sault Ste. Marie	4,227	1,843,878	473,805	2,513,781	306,965	429,484	35,897	1,120,741	69,495	1,970,131	78.37	543,651	206,790	336,861	—176,226
Mo., Okla. & Gulf	332	131,983	28,069	168,415	33,284	42,195	2,567	79,404	7,779	165,369	99.19	3,046	9,000	—6,103	3,039
Mo. Pacific	7,301	5,300,823	1,465,775	7,338,205	967,268	1,218,345	118,623	2,754,586	153,961	5,230,997	72.28	2,107,209	278,486	1,827,782	.....
Mobile & Ohio	1,159	876,292	142,895	1,089,921	134,465	323,790	38,244	463,960	931,818	992,276	91.14	97,643	41,396	56,138	—176,738
Monongahela	108	183,503	20,865	210,717	54,023	19,250	1,119	27,008	3,963	155,364	73.73	55,354	3,755	51,599	—27,401
Monongahela Connecting	5	.....	.....	194,499	25,409	30,216	376	89,415	4,533	149,950	77.10	44,549	2,386	42,163	—13,921
Morgan's La. & Tex. R. R. & S. S. Co	400	493,481	144,996	681,001	96,379	64,179	10,814	197,882	13,494	380,667	55.90	300,334	22,907	277,330	145,507
Nash., Chatt. & St. L	1,236	1,159,929	360,994	1,619,269	142,393	273,622	47,525	649,028	38,775	1,155,458	72.36	463,810	33,334	430,333	208,120
Nevada North	168	181,461	15,270	202,047	16,952	25,998	864	48,990	5,326	98,331	48.67	103,715	10,398	92,708	—12,550
Newburgh & S. Shore R. R. Co	15	.....	2	94,246	13,247	25,342	.....	50,542	591	89,902	95.40	4,344	6,028	—1,684	18,776
New Orleans, Tex. & Mex	191	177,675	47,620	229,101	35,311	26,923	3,686	44,221	5,861	116,003	50.63	113,098	3,080	109,968	81,188
New York Cent	6,079	14,841,897	4,348,306	21,920,846	2,316,019	4,684,910	216,224	9,065,761	491,610	17,044,740	77.75	4,875,906	889,608	3,985,078	147,392
New York, Chic. & St. L	571	1,542,649	77,256	1,665,171	175,283	272,842	40,309	724,317	40,598	1,256,516	75.46	408,655	57,500	351,039	171,497
New York, Ont. & West	567	641,792	78,122	815,944	78,457	170,684	6,482	422,520	18.835	696,978	85.42	118,965	22,720	96,006	—5,869
Norfolk & Western	2,085	4,887,072	624,976	5,770,591	674,080	1,475,009	57,658	2,001,044	109,814	4,331,471	75.06	1,439,120	272,000	1,163,901	—589,714
Norfolk Sou.	907	365,067	104,886	492,612	64,951	72,429	6,537	203,254	20.159	367,433	74.59	125,179	15,810	109,308	—49,005
Northern Pac	6,596	5,917,144	1,277,170	7,716,353	900,898	1,031,720	83,618	2,646,681	135,688	4,851,087	62.87	2,865,266	640,938	2,214,848	82,815
Northwestern Pac.	507	183,57)	141,227	362,143	63,354	42,607	3,930	133,077	9,423	253,265	68.79	108,897	20,962	87,935	38,574
Penn. Co.	1,754	4,838,443	1,105,808	6,541,364	1,058,581	1,654,280	81,112	3,040.899	165.799	6,042,997	92.38	498.365	284.973	213,391	—342,633
Penn. R. R.	5,284	15,778,600	6,639,228	25,449,567	3,399,617	6,786,240	215,216	11,741,587	619,075	23,151,742	90.97	2,297,827	867,507	1,428,526	—2,772,993
Peoria & Pekin Union	19	23,611	6,431	117,694	10,116	19,519	26	71,310	3,916	104.887	89.12	12,807	9,453	3,354	3,131
Pere Marquette	2,245	1,818,242	286,641	2,281,208	260,238	406,804	32,951	916,669	57,969	1,676.111	73.47	605,097	52,477	552,458	275,874
Phila. & Reading	1,126	5,122,456	581,286	6,064,844	492,108	1,365,605	34,096	2,771,303	106,431	4,782,078	78.85	1,282,766	137,094	1,145,669	—467,090

Program of Convention of Fuel Association

The tenth annual convention of the International Railway Fuel Association will be held at the Hotel Sherman, Chicago, on Thursday and Friday, May 23 and 24, under the auspices of the United States Railroad Administration and the United States Fuel Administration. The convention will open on the first day at 10 a. m. and on the second day at 9:30 a. m. The program is as follows:

Thursday

Introductory Address by E. W. Pratt, President, International Railway Fuel Association.

"The Railroads and Their Relation to the Fuel Problem," by C. R. Gray, Director, Division of Transportation, United States Railroad Administration.

"What Can Be Done for Our Northern Ally," by Sir George Bury, Chairman, Canadian Railways War Board.

"What the Men on the Locomotives Can Do," by W. S. Stone, Grand Chief, Brotherhood of Locomotive Engineers.

"The Motive Power Department and Fuel Economy," by R. Quayle, General Superintendent, Motive Power and Car Department Chicago & North Western.

"The Railroad Industrial Army," by W. S. Carter, Director, Division of Labor, U. S. Railroad Administration.

"Relation of Locomotive Maintenance to Fuel Economy," by Frank McManamy, Director, Division of Locomotive Maintenance, U. S. Railroad Administration.

"The Transportation Department and Fuel Economy," by E. H. De Groot, Jr., Assistant Manager, Car Service Section, Division of Transportation, U. S. Railroad Administration.

Friday

"The Fuel Problem and the War," by H. A. Garfield, U. S. Fuel Administrator.

"The Need for Fuel Conservation," by P. B. Noyes, Director, Conservation Division, U. S. Fuel Administration.

"The Supply and Distribution of Fuel," by J. D. A. Morrow, Director, Distribution Division, U. S. Fuel Administration.

"The Coal Operator and His Responsibilities," by Edwin Ludlow, Vice-President, Lehigh Coal & Navigation Company, Lansford, Pa.

"What the Coal Miner Can Do," by John P. White, Labor Advisor, U. S. Fuel Administration.

"What the Coal Operator Can Do," by H. N. Taylor, Vice-President, Central Coal & Coke Company, Kansas City.

"Individual Effort Toward Fuel Savings," by Eugene McAuliffe, Manager, Fuel Conservation Section, U. S. Railroad Administration.

Exhibitors at the Air Brake Convention

The companies exhibiting devices at the Air Brake Association Convention, which was held at the Hotel Winton, Cleveland, Ohio, May 7 to 10, together with a list of their representatives is given below:

Ashton Valve Company, Boston Mass.—Gages, gage testers and safety valves. Represented by H. O. Fettinger.

Barco Manufacturing Company, Chicago, Ill.—Engine-tender air connections and air reservoir joint connections. Metallic car steam heat connections. Represented by F. N. Bard and C. L. Mellor.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. G. Machesney.

Dielmore Valve Company, Tacoma, Washington.—Automatic drain and relief valve for single or compound air pumps, and Vincent grease plug for side rods on locomotives. Represented by W. P. McLaren.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by L. H. Snyder, F. R. Brandon and William Ernst.

Garlock Packing Company, Palmyra, N. Y.—Air brake gaskets, air pump and spiral packing. Represented by C. F. Flood.

Goff Electro-Pneumatic Brake, Collingswood, N. J. Represented by Frank Goff.

Gould Coupler Company, New York.—Gould universal automatic brake slack adjuster. Represented by W. F. Richards, Geo. R. Berger, W. Garstang and W. H. Sauvage.

Johns-Manville Company, H. W., New York.—Airbrake throttle and brake cylinder packing, expansion rings and slack adjuster. Represented by J. E. Meek, C. E. Murphy, Fred Horne, L. C. Sprague and G. Christenson.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. J. Leslie and J. J. Cizek.

New York Air Brake Company, New York—Air pump strainer, Type J slide valve, feed valve. Represented by N. A. Campbell, L. W. Sawyer, B. Hyanes, Wm. Owens and B. Pratt.

New York and New Jersey Lubricant Company, New York.—Non-fluid-oil brake cylinder lubricant and N. F. O. triple valve lubricant. Represented by J. H. Bennis and W. W. Orvis.

New York Belting and Packing Company, New York.—Represented by L. F. Purtill.

Perfection Adjustable Hand Reamer Company, Cleveland, Ohio—Reamers for valve and governor bushings. Represented by C. Feagler.

Simmons-Boardman Publishing Co., New York.—*Railway Age*, *Railway Mechanical Engineer* and *Railway Electrical Engineer*. Represented by H. H. Marsh and A. F. Stuebing.

United States Rubber Company, New York.—Mechanical goods division, air brake hose, pneumatic tool hose, gaskets and packings. Represented by C. S. Prosser, W. B. Wise and T. P. Dunham.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Slack adjuster, hose mounting and clamping devices. Represented by Walter V. Turner, A. W. Dudley, J. B. Wright, F. H. Parke, T. W. Newburn, A. L. Berghane, G. B. Fierce, F. M. Nellis, E. H. Dewson, H. H. Burns, J. C. Kuhnert, F. B. Johnson, F. H. Whitney, J. S. Y. Fralich, E. Weaver, T. H. Thomas, B. F. Key, G. A. Stenson, A. L. Houston, R. E. Miller, L. J. Gwynne, E. Richards, W. M. Sleet.

Traffic News

Waiving the customary thirty-day period after the publication of a tariff schedule, the State Public Utilities Commission of Illinois on May 8 permitted attorneys representing railroads in Illinois to file a petition for the reclassification of commodities. The commission will open a hearing on the matter at Springfield, Ill., on May 15 and after a week in that city it will continue the hearing at Chicago. A request by shipping interests for a thirty-day postponement of the hearing was not granted.

Freight, in carload lots, destined for Baltimore or Philadelphia, is now received by the trunk lines for shipment to either of those cities only on a special permit for each shipment; which permit must be procured from the local committee, which will issue it only after having been assured that the consignee of the freight will unload it promptly. The committee consists of Presidents Rhea, of the Pennsylvania, and Dice of the Reading, and Vice-President Thompson of the Baltimore & Ohio.

The Erie Canal was opened for business on May 15. The government manager, G. A. Tomlinson, announced in New York last week that the government had bought 30 tugs and had taken 165 of the barges heretofore in use on the canal, this in order to begin taking freight without waiting for the construction of new barges. Of the new and larger barges there will be 75, some of them steel and some concrete. None of these will be self-propelling; it was found that the construction of boats with engines would require a much longer time. The new barges will be 150 ft. long, 21 ft. beam, and 12 ft. moulded depth.

Shipments of anthracite in April, as reported by the Anthracite News office, amounted to 6,368,372 tons, an increase of about 14 per cent over those of the corresponding month of last year. It is anticipated that with the working energy now in force, this year's total output may reach 80,000,000 tons, a gain of 3,000,000 tons over 1917. A satisfactory supply of cars is available to move all anthracite as currently produced. The order prohibiting shipments to 19 states south and west, except on special permits, affects, relatively, a limited tonnage. New England shipments have been limited somewhat by embargoes which have been intermittent on the New Haven and quite steady on the Boston & Albany for two weeks past.

Coal Movement

During the month of April the railroads transported coal at a rate which, if continued throughout the year, will make up the amount which the Fuel Administration estimates will be required, according to statistics compiled by the Railroad Administration. During the four weeks ending April 27 the bituminous coal loaded into cars amounted to 895,318 carloads, an increase of 73,978 cars as compared with the corresponding period of 1917.

The Geological Survey reports that bituminous output declined slightly during the week ended May 4, after three successive weeks of rising production. The total production of soft coal (including lignite and coal made into coke) is estimated on the basis of railway shipments at 11,559,000 net tons as compared with 11,803,000 net tons during the preceding week, or a decrease of 2 per cent. Production per working day is estimated at 1,927,000 net tons, considerably in excess of 1,829,000 net tons, the average during the month of May, 1917.

Losses attributed to transportation conditions declined during the week ended April 27 from 16.2 per cent of potential capacity during the preceding week to 14.4 per cent; losses due to labor conditions from 4.8 per cent to 4.4 per cent; those due to mine disability from 3.3 per cent to 2.8 per cent and to market losses from 1.8 per cent to 1.2 per cent.

Anthracite shipments during the week ended May 4 rose to 40,570 cars, the largest since the week of March 30.

Commission and Court News

Interstate Commerce Commission

The commission has announced a series of hearings, before Commissioner Aitchison, in various cities, for the purpose of giving all interested parties an opportunity to express their views as to the exact definition of the five zones of standard time, which the commission was authorized to establish in the "daylight saving" law.

The Interstate Commerce Commission has announced a hearing at Washington on May 27 for the consideration of a set of suggested amendments proposed by the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, after exhaustive conference with shippers and carriers, to the commission's regulations on this subject. By reason of new information and altered conditions certain modifications are desirable. Unless objections are presented and sustained, the proposed amendments will be adopted. Therefore, the commission says, attendance upon the hearings seems not to be important except for the purpose of presenting objections.

Private Car Line Report

The Interstate Commerce Commission has made public the tentative report of Attorney-Examiner G. N. Brown on the commission's investigation of private cars. An important part of the interstate commerce of the country is transported in privately owned cars and, says the report, it is to the interest of the owners, the carriers and the public that their operations should be continued under such rules and regulations as will insure their efficient handling without discrimination. Different phases in connection with the use of privately owned cars are considered in detail in the report and recommendations are made with respect to their use for the future. In conclusion, the report recommends: That shippers may continue to lease cars independently for the transportation of their shipments; that carriers require statements of car line charges made by car owners against shippers, for publication in their tariffs; that a charge in addition to freight rates should not be made for furnishing to shippers refrigerator, tank or other special types of cars unless the freight rates are predicated on transportation in another type of cars less expensive and less difficult to operate; that the basis for the compensation to be paid owners of private cars should not be on the cost of cars and shops, etc., depreciation, taxes, cost of operation and maintenance and interest on investment, but that payments should be made by the carriers on the basis of loaded and empty mileage; and that the mileage should be computed on the basis of distance tables without the elimination of mileage movements through the switching districts.

It is recommended that there be no increase in the present payment for the use of refrigerator cars and so-called meat cars east of El Paso, Albuquerque, Salt Lake City and Ogden, but that the present rate of three-quarters of a cent per mile on the loaded and empty movement of tank cars be increased to one cent and that an increased allowance should be paid on live poultry cars, palace stock, heater and other privately owned cars which are used, operated and controlled by shippers, where the payment is now less than one cent a mile. It is recommended that there should be no increase on stock, coke, coal, rack, flat, box or pocket cars, although privately owned. The examiner also recommends that the master carbuilders' rules be not filed as tariffs.

The report estimates that on January 1, 1918, there were in the United States 200,000 private cars. This includes 135,000 tank and refrigerator cars, and the remaining 65,000 is made up of stock cars, coal cars, palace stock cars, heater cars, etc. It is estimated that these 200,000 cars represent an investment of $250,000,000; and in addition to this the owners of the cars have large investments in repair shops, etc.

Equipment and Supplies

The Mechanical and Purchasing Committees of the Railroad Administration have heen holding joint meetings to consider the specialties for cars and locomotives ordered which have been recommended by the Mechanical Committee in the light of bids submitted by manufacturers. Various representatives of manufacturers have been called in to discuss the proposed orders for their devices, while some have been told tentatively that they will be given orders. No announcement of the specialties selected is expected for several days.

Freight Cars

THE VIRGINIAN is inquiring for 15 caboose cars.

THE BALTIMORE & OHIO is inquiring for 100 steel underframes for caboose cars.

THE CUBAN AMERICAN SUGAR COMPANY is inquiring for five 6,500-gal. tank cars.

THE TRUMBULL STEEL COMPANY, Warren, O., is inquiring for ten 50-ton steel gondola cars.

THE PINE POOL GASOLINE COMPANY, Okmulgee, Okla., is inquiring for 40 8,000-gal. insulated tank cars.

THE CABLE CHEMICAL COMPANY, Charleston, S. C., is inquiring for 25 50-ton, 7,000-gal. sulphuric acid tank cars.

THE COLORADO & WYOMING has ordered ten 50-ton gondola cars from the Western Steel Car & Foundry Company.

THE CHIMO COPPER COMPANY, Salt Lake, Utah, has ordered 24 underframes from the Pressed Steel Car Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for a number of ore cars, not over 25 ft. long.

THE WITTAKER GLESSNER COMPANY, Portsmouth, Ohio, has ordered four 50-ton gondola and seven 50-ton hopper cars from the Pressed Steel Car Company.

Passenger Cars

THE PACIFIC ELECTRIC is inquiring for 25 motor cars.

THE BOSTON ELEVATED is inquiring for prices on 200 motor cars and 100 trailers.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for a number of passenger cars.

Miscellaneous

THE ST. LOUIS SOUTHWESTERN has ordered from the Roberts & Schaefer Company, Chicago, two automatic electric coaling plants, to be of reinforced concrete and of 200-tons' capacity each. These will be duplicates of the plant that was recently built for the same road at Valley Junction, Ill. The new plants are to be built at Commerce, Tex., and Jonesboro, Ark.

BUILDING LOCOMOTIVES IN DENMARK.—Commerce reports, under date of March 28, says that building of locomotives is progressing in Denmark. The firm of Frische & Co., Aarhus, has recently booked an order from the Government for 20 new locomotives.

JAPAN BUYS LIGHT RAILWAY.—The Government has decided to purchase the Ishinomak Light Railway, which runs from Kogota to Ishinomaki, in Miyagi prefecture. The decision was made in consequence of the recent completion of the Trans-Ou Railway, with Kogota as the eastern terminus.—*The Far Eastern Review.*

Supply Trade News

The H. W. Johns-Manville Company announces that after July 1, 1918, its Houston office will be located at 424-426 Washington avenue, Houston, Tex.

John A. Dienner, formerly assistant examiner of the United States Patent Office, and for the past four years associated with Brown, Hanson & Boettcher, Chicago, in the practice of patent and trademark law, has become a member of that firm.

H. D. Wright, manager of the San Francisco office of the Brown Hoisting Machinery Company, has been appointed Pacific coast representative succeeding the Colby Engineering Company in the northwest territory. Mr. Wright's offices are in the Monadnock building.

H. S. Patterson has been appointed manager of the railroad department of the Walworth Manufacturing Company, with headquarters in Boston. **H. T. Goodwin** has been appointed assistant manager of the railroad department, with headquarters in New York. Both Mr. Patterson and Mr. Goodwin obtained their training with the National Tube Company by taking the specialty course at the Kewanee works of the National Tube Company, now the Walworth Manufacturing Company.

C. Z. Moore, supervisor division No. 4 of the Philadelphia division of the Pennsylvania Railroad, with headquarters at Middletown, Pa., tendered his resignation, effective May 1, to associate himself with **John Lundie,** consulting engineer, 52 Broadway, New York, inventor and producer of the Lundie tie plate. Mr. Moore entered the service of the Pennsylvania Railroad, October 1, 1894 in the division engineers' office at Harrisburg, Pa. One year later he was transferred to the construction department where he assisted for several years in heavy construction work. Later he returned to the maintenance of way department and served as transitman, assistant supervisor and supervisor at various points on the system. For the past few years he has been most successful in work as a track engineer, having taken in competition the general manager's prize for five consecutive years, the awards being made for the greatest improvement and the best track on the system and superintendent's division. Mr. Moore will represent Dr. Lundie with office in the Finance building, Philadelphia, Pa.

C. Z. Moore

The Austin Company, Cleveland, O., announces that **G. E. Lemmerich** has joined the engineering staff of that company, to devote his entire attention to the design of railway terminal buildings, having specialized in this work with the various railroads in the United States for a number of years. Mr. Lemmerich began his railway career in 1881 as axeman for the Pennsylvania, and has been doing railway layout work for over 20 years. In 1898 he was with the Central Railroad of New Jersey on engine terminals, freight terminals, and on special work in connection with the Elizabethport shops. In 1902 he was employed by the Delaware, Lackawanna & Western on the construction of freight car repair shops, at Scranton, and in 1903 at Jersey City on the proposed terminals for the Erie. In 1904 Mr. Lemmerich was employed with the Northern Pacific working on layouts for division terminals. During the past eight years he has been associated with the design of freight terminals on the Illinois Central and the Chicago & Western Indiana, and with the design of engine terminals on the Western Maryland. The Austin Company, which has specialized in the construction of standard buildings erected in 30 to 90 days, is now designing engine terminal, shop and other railway buildings for similar rapid construction.

Edward Buker has been appointed western representative of Rome Iron Mills, Inc., with office in the McCormick building, Chicago. Mr. Buker was born in Chicago in 1885. He received his education in the public schools at that city and at the University of Illinois, from which institution he received the degree of Mechanical Engineer. While at college his summer vacations were spent in South Chicago rolling mills. Immediately upon graduation from college Mr. Buker entered the service of the Pullman Company as apprentice in that company's car shops in Chicago. After serving his time he went as special apprentice in the locomotive shops of the Illinois Central. Two years later he accepted a position as inspector on the Chicago, Rock Island & Pacific and was later appointed general foreman on the same road. Leaving the Rock Island he went with the Missouri, Kansas & Texas as master mechanic. During the past two years he has been with the Galena-Signal Oil Company as mechanical expert, which position he held up to the time of his recent appointment.

E. Buker

Trade Publications

SWITCH STANDS.—The Ramapo Iron Works, Hillburn, N. Y., has just issued its Pamphlet No. 17, descriptive of the Ramapo automatic safety switch stands. This is a 16-page book with illustrations and shows in detail the character of construction and the manner of operation of this type of switch stands.

MOTIVE POWER PROBLEM.—The Baldwin Locomotive Works in Record No. 90 has issued in booklet form the address of its president, Alba B. Johnson, before the annual convention of the Chamber of Commerce of the United States, at Chicago, April 11, entitled "The Problem of Motive Power Under the National Administration of Railroads." Mr. Johnson's paper was published in the *Railway Age* of April 12, page 965.

RAILWAY CONSTRUCTION IN DOMINICAN REPUBLIC.—There are two railroads in the Puerto Plata consular district, viz., the Dominican Central, owned by the Dominican Government, and the Samana & Santiago, owned by Scotch capitalists. The Dominican Central connects Puerto Plata with Santiago, a distance of 42 miles, with a further extension of 17 miles to Moca. Traffic on this road was suspended the first half of 1916, but operations were resumed in July of that year. The service has improved gradually, and the railroad has been reconstructed throughout, 700 tons of new 60-lb. rails and 50,000 new ties being laid. The telephone system has been placed in good condition, and new apparatus have been installed. All bridges, stations and other buildings have been painted and repaired. Work was commenced on a cut-off between Barrabas and La Sabana, which will reduce the grade from 9½ to 3 per cent and reduce the maximum curvature to 32 degrees. The Samana & Santiago made considerable progress with its seven-mile branch between Moca and Salcedo. When completed, this branch line will link the Samana & Santiago with the Dominican Central, thus connecting the ports of Sanchez and Puerto Plata by rail.—*Commerce Reports.*

Financial and Construction

Railway Financial News

DENVER & RIO GRANDE.—An agreement has been reached between the Denver & Rio Grande and Western Pacific interests and Government officials whereby the Denver & Rio Grande will secure funds to pay off its interest and other obligations up to and including June 1, with the exception of the judgment for approximately $38,000,000 held by the Western Pacific against the Denver. This agreement plans for the wiping out of approximately $4,500,000 indebtedness, which includes $2,400,000 bond interest, unpaid or due June 1. The Railroad Administration will advance $1,500,000, on account of the Denver rental, and the Equitable Trust Company will advance $1,800,000 and will purchase certain Treasury securities, Liberty bonds, etc., while $625,000 in cash in the Denver's treasury now under attachment will be released by order of the court. By agreement also $900,000 on deposit with trustees for Denver bonds will be available.

DES MOINES & FORT DODGE.—See Minneapolis & St. Louis.

MINNEAPOLIS & ST. LOUIS.—Judge Charles M. Hough in the Federal Court at New York has dismissed the suit of William Mitchell and others as temporary administrators of the estate of Amos F. Eno against the Des Moines & Fort Dodge and the Minneapolis & St. Louis railroads. The plaintiffs sought to prevent the consolidation of the roads and to compel the payments of dividends on stock in their possession.

MISSOURI PACIFIC.—Bertram Cutler has been elected a director to succeed Carl Gray.

NEW YORK CENTRAL.—This company has obtained $6,000,000 for six months at six per cent from the Central Trust Company of New York through the efforts of Director General McAdoo. See "Doings of the United States Railroad Administration" on another page of this issue.

ST. LOUIS-SAN FRANCISCO.—James N. Wallace has been elected a director to succeed E. D. Levy, resigned.

WASHINGTON, BRANDYWINE & POINT LOOKOUT.—See Washington, Potomac & Chesapeake.

WASHINGTON, POTOMAC & CHESAPEAKE.—A new corporation, the Washington, Brandywine & Point Lookout Railroad has been formed to operate this road which last December was sold for junk to Joseph Bros. & Co. for $92,500. The purchasers had begun to dismantle the railroad when proceedings were begun by prominent citizens which stopped the dismantling. A new charter was procured and stock was subscribed for. After $75,000 had been raised and the Government had loaned $50,000 on first mortgage, a contract for the purchase of the road from Joseph Bros. & Co. for $125,000 was signed on May 6 in the office of Judge John B. Payne, general counsel for the director general of railroads.

Railway Construction

ILLINOIS CENTRAL.—This company has completed plans for the construction of a 12-stall roundhouse, a turntable and a machine shop at Carbondale, Ill., to cost about $200,000. It is also planning to enlarge its mechanical facilities at Champaign, Ill. The work, in the main, will consist of the construction of new roundhouse stalls and will cost about $150,000. At Centralia, Ill., the company proposes to construct additional tracks in both its north and southbound yards at a cost of about $150,000. At Paducah, Ky., it is planning mechanical facilities, including a new roundhouse containing 32 stalls, which will cost approximately $200,000. Plans are also being prepared for a hospital building at Paducah, the construction of which the company expects to start in about six weeks. The road expects to complete plans for its Fifty-third street (Hyde Park) station, Chicago, in about two months.

Railway Officers

Executive, Financial, Legal and Accounting

J. B. Myers has been appointed auditor of the Montana, Wyoming & Southern, with office at Belfry, Mont., succeeding **A. R. Clement**, resigned to enter other business.

W. J. Jackson, receiver of the Chicago & Eastern Illinois, with headquarters at Chicago, has resigned and has been placed in charge of the operation of the road with the title of president. **Thomas D. Heed**, of Chicago, succeeds Mr. Jackson as receiver.

A. E. Warmington has been appointed assistant to the president of the California Southern, with headquarters at Los Angeles, Cal. **J. C. Odell** has been elected treasurer, with headquarters at Los Angeles, Cal., succeeding **J. R. Grant**, who continues as secretary.

J. E. Conklin, assistant to the president of the Anthony & Northern, has been elected vice-president, with office at Hutchinson, Kans., and **T. A. Fry** has been elected secretary, with headquarters at Hutchinson, Kans., succeeding **E. M. Vetter.** Mr. Fry continues the duties of treasurer and purpurchasing agent.

Winfield S. Cooper, whose appointment as assistant to the vice-president in charge of operation of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* on May 3, was born at Polk, Ohio, on February 15, 1862. Mr. Cooper's railway work began in May, 1877, when he became a telegraph operator on the New York, Pennsylvania & Ohio, which has since become part of the Erie. Subsequently he was consecutively operator and train despatcher on the Louisville & Nashville, train despatcher on the New York, Pennsylvania & Ohio, train despatcher on the Canadian Pacific, and from 1886 to 1895 train despatcher and chief despatcher on the Chicago, Milwaukee & St. Paul. In 1895 he was appointed trainmaster, and in February, 1903, he was promoted to superintendent. Three years later he was again promoted, this time to assistant general supeintendent, with headquarters at Chicago. He continued in that position for six years, following which on February 1, 1912, he became general superintendent of the southern district, with the same headquarters, holding this position until his recent appointment as assistant to the vice-president, as mentioned above.

W. S. Cooper

Operating

J. D. Feeney has been appointed acting superintendent of the Anthony & Northern, with office at Pratt, Kans., succeeding **C. F. Jeff.**

F. O. Bamforth, treasurer of the Cincinnati, Findlay & Ft. Wayne, which road is operated by the New York, Chicago & St. Louis, has also been appointed superintendent.

A Ross, superintendent of the Lehigh Valley at Easton, Pa., has been appointed superintendent of New York division, vice **S. S. Stone**, resigned; **M. A. Mulligan**, superintendent at Hazleton, has been appointed superintendent of the New Jersey & Lehigh division, vice Mr. Ross, and **P. T. Reilly**, general yard inspector at Bethlehem, has been ap-

pointed superintendent of the Mahanoy & Hazleton division, vice Mr. Mulligan, transferred.

W. M. Bacon, assistant superintendent of the St. Louis Southwestern, with headquarters at Mt. Pleasant, Tex., has been appointed assistant superintendent of the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding **G. W. Barr. A. R. Stith** has been appointed superintendent of car service, with headquarters at Denver, Colo., succeeding **W. T. Bruning.**

J. B. Blair, who has been appointed superintendent of the Canadian Pacific with headquarters at Farnham, Que., as has already been announced in these columns, was born on November 17, 1876, at Whitby, Ont., and was educated at Dufferin school, Toronto, and at the Toronto Normal school. He began railway work in May, 1894, with the New York, Ontario & Western, at Norwich, N. Y., and subsequently served consecutively on the New York, New Haven & Hartford, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, and the Southern Railway, in various capacities in train service. From June, 1914, to January, 1916, he was general yardmaster of the Canadian Pacific at Windsor, Ont., and then to the following month was assistant superintendent at London. In February, 1916, he was appointed assistant superintendent of terminals at Montreal, Que., which position he held at the time of his recent appointment as superintendent of the same road as above noted.

A. J. Miller, whose appointment as superintendent of car service of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., has already been announced in these columns, was born on October 3, 1877 at Dunmore, Pa., and was educated in the high schools and at business college. He began railway work in March, 1902, with the Delaware, Lackawanna & Western as a clerk in the car service department. He subsequently held different positions in this department and in October, 1912, was promoted to traveling car agent, remaining in that position until July, 1916, when he left that road to become chief clerk to the superintendent of car service of the Central of New Jersey, at Jersey City, N. J. In November, 1916, he returned to the service of the Delaware, Lackawanna & Western, as general chief clerk to the superintendent of car service, which position he held at the time of his recent appointment as superintendent of car service of the same road, as above noted.

A. J. Miller

W. M. Weidenhamer, whose appointment as general superintendent of the southern district, of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* on May 3, was born in Schuyler County, Ill., on June 23, 1863. He entered the service of the Chicago, Burlington & Quincy on January 2, 1880, as a brakeman and was promoted to conductor on February 12, 1885. On May 4, 1904, he was assigned to special duties by the operating vice-president. On November 1, 1904, he was appointed trainmaster of the Galesburg division, with headquarters at Galesburg, Ill., and on October 15, 1905, he was transferred in the same capacity to the McCook division, with headquarters at McCook, Nebr. He was promoted to superintendent of the Sterling division on December 15, 1908, with headquarters at Sterling, Colo., and on December 1, 1909, was transferred to the Alliance division, with headquarters at Alliance, Nebr. He left the Burlington in December, 1917, to become inspector of transportation of the Chicago, Milwaukee & St. Paul, which position he held until his recent promotion to general superintendent of the southern district, as mentioned above.

Martin J. Larson, whose appointment as superintendent of the Southern Minnesota Division, of the Chicago, Milwaukee & St. Paul, with headquarters at La Crosse, Wis., was announced in the *Railway Age* on May 3, was born in Norway, on April 19, 1866. He began railway work as a messenger in the passenger department of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., on September 15, 1882. The following year he was employed as a clerk in the purchasing department at Milwaukee; then in March, 1884 as a clerk in the general superintendent's office at Milwaukee. In June, 1889 he was appointed chief clerk to the division superintendent at Sioux City, Iowa. In July, 1903, he was transferred to the general manager's office at Chicago, and on May 1, 1907 he was promoted to trainmaster at Sioux City, Iowa. In July, 1912, he was appointed assistant to the assistant general manager at Chicago, where he remained until his recent appointment as superintendent of the Southern Minnesota division.

Hugh Wilson, assistant division superintendent of the Baltimore & Ohio at Grafton, W. Va., has been appointed superintendent of the Monongah division, with headquarters at Grafton, vice **J. W. Deneen,** promoted; **P. C. Allen** has been appointed superintendent of the Baltimore division, with headquarters at Baltimore, Md., vice **C. B. Gorsuch,** granted leave of absence; **B. Z. Holverstott,** trainmaster at Fairmont, W. Va., has been appointed assistant superintendent of the Monongah division with headquarters at Grafton, vice Mr. Wilson; **J. K. Flaherty,** road foreman of engines on the Monongah division, has been appointed assistant superintendent, with office at Cumberland. **J. N. Niland,** general yardmaster at Cumberland has been appointed trainmaster with office at Grafton, succeeding **J. McClung,** transferred to Clarksburg. **P. E. Marsh,** road foreman of engines, with office at Weston, has been appointed trainmaster with office at Clarksburg to succeed **E. Bartlett,** who has been transferred as trainmaster to Fairmont, succeeding Mr. Holverstott.

Traffic

F. J. Toner has been appointed acting general freight and passenger agent of the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding **W. H. Paul.**

H. A. Fletcher, commercial agent of the Central of Georgia, with office at Chicago, has resigned to accept service with the Illinois Central, and the agency at Chicago has been closed.

G. A. Westcott, general freight and passenger agent of the Copper Range, has been appointed traffic manager, with office at Houghton, Mich. The office of general freight and passenger agent has been abolished.

F. G. Abbey, assistant general freight agent of the Missouri, Kansas & Texas, of Texas, with headquarters at Dallas, Tex., has resigned to become Washington representative of the Southern Products Company.

William M. Mortimer, general freight and passenger agent of the Coal & Coke, with office at Charleston, W. Va., having resigned to accept other service, the position of general freight and passenger agent has been abolished.

J. H. Webster, general agent of the passenger department of the Erie, has been appointed division passenger agent, with headquarters at Elmira, N. Y., and **F. Ralph** has been appointed division passenger agent, with office at New York.

William Owens, northern passenger agent of the Chicago & Alton, at Milwaukee, has been appointed passenger agent at the Union Station at Chicago, succeeding **H. E. Thomas,** who has resigned to enter the army. The position held by Mr. Owens at Milwaukee has been abolished.

C. McD. Davis, general freight agent of the Atlantic Coast Line, with office at Wilmington, N. C., has been temporarily detached from his duties with the Atlantic Coast Line for service with the Southern Freight Rate Committee at Atlanta, Ga. Until further advised, the duties of the general freight agent will be performed by J. W. Perrin, assistant freight traffic manager at Wilmington; **S. H. Dare,** general western freight agent at Chicago, has been appointed division freight agent, with office at Montgomery, Ala.

Engineering and Rolling Stock

S. W. Heckathorne has been appointed master mechanic of the Anthony & Northern, with headquarters at Pratt, Kan., succeeding **S. C. Reep.**

J. B. McClain, assistant bridge engineer of the Seaboard Air Line, with office at Norfolk, Va., has been appointed bridge engineer, vice **Guy Pinner,** resigned to accept service elsewhere, and **W. C. Binford** has been appointed assistant bridge engineer, vice Mr. McClain.

C. Gribbin, master mechanic of the Canadian Pacific at North Bay, Ont., has been appointed master mechanic of the New Brunswick district, with office at St. John, N. B., succeeding **C. Kyle,** transferred; **T. Hambley** has been appointed master mechanic, with headquarters at North Bay, vice Mr. Gribbin; and **J. S. Allen** has been appointed general foreman, locomotive erecting shop, at North Bay.

A. B. Enbody, assistant master mechanic of the Central of New Jersey, with office at Mauch Chunk, Pa., has been appointed master mechanic of the Lehigh & Susquehanna division in charge of locomotive and car departments, and assignment of power, with office at Ashley, and **C. W. Culver,** general foreman at Mauch Chunk, has been appointed assistant master mechanic of the Lehigh and Susquehanna division, with office at Mauch Chunk.

H. S. Wall, whose appointment as mechanical superintendent, of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., was announced in the *Railway Age* on April 12, has been in the employ of the Atchison, Topeka & Santa Fe for a period of nearly 19 years. On October 5, 1899, Mr. Wall entered the services of that company as a machinist at Albuquerque, N. M., and on April 1, 1900, he was appointed roundhouse foreman at Needles, Cal. On July 1 of the same year he was promoted to general foreman at the same place, and on August 15, 1900, he was promoted to division foreman at Barstow, Cal. He remained there until May 1, 1906, when he was promoted to master mechanic at Winslow, Ariz., being transferred on October 21 of the same year to Needles, Cal. On July 1, 1909, he was promoted to shop superintendent at San Bernardino, Cal., which position he held until his recent appointment as mechanical superintendent of the coast lines as mentioned above.

H. S. Wall

Purchasing

The New York, New Haven & Hartford announces that on May 7, the purchasing department and stores department were consolidated, with headquarters at New Haven, Conn., and both departments are now known as the "supply department," under the supervision and management of **George G. Yeomans,** general purchasing agent, and **G. W. Hayden,** assistant purchasing agent. The supply agents, Lines East and West, will co-operate and rank with maintenance engineers and mechanical superintendents. The division supply agents will co-operate and rank with division master mechanics and division engineers.

Railway Officers in Government Service

F. R. Hanlin has been appointed export agent for the regional director of western railroads, with headquarters at Seattle, Wash.

W. W. Walker, vice-president and general manager of the Duluth, South Shore & Atlantic, has been appointed chairman of the terminal committee in charge of railroad operations at Duluth, effective May 7.

William Sproule, president of the Southern Pacific, has been appointed chairman of the western department of the western railroad region, with headquarters at San Francisco, Cal., and will assist the regional director of western lines in supervising the operation of the roads in California and adjacent states.

W. B. Scott, president of the Southern Pacific, Texas and Louisiana lines, has been appointed chairman of the southern department of the western railroad region, with headquarters at Houston, Tex., and will assist the regional director of western roads in directing the operation of the railways in that section of the western territory.

H. J. Bell, safety inspector of the Chicago & North Western, has been appointed safety supervisor of the railroads under the jurisdiction of the western regional director. Mr. Bell is in Washington at present, where he is familiarizing himself with his new work under the supervision of H. W. Belnap, manager of the Safety Section of the United States Railroad Administration. He expects to assume his new duties with headquarters at Chicago in about a month.

Joseph W. James, assistant to the general manager of the Buffalo, Rochester & Pittsburgh, has been appointed special representative under J. M. Herbert, chairman Inter-regional committee, in charge of railway operation, at St. Louis and East St. Louis. Mr. James was born at Cooper's Plains, Steuben county, New York, on August 10, 1879. He began his railway work in 1894, with the Delaware, Lackawanna & Western as telegraph operator. Subsequently he held various positions, such as telegraph operator, agent, yardmaster, train despatcher, general yardmaster, chief train despatcher and trainmaster, on various roads including the Great Northern, the Union Pacific, the Southern Pacific, the Louisville & Nashville, the Atlantic Coast Line, the Illinois Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Pennsylvania, the Missouri, Kansas & Texas, and the St. Louis & San Francisco. Mr. James has made an exhaustive study of train despatching, handling train orders and train rules. He was recently instrumental in revising the operating rules of the Buffalo, Rochester & Pittsburgh, where he was also the founder and editor of the employees' magazine. He originated and superintended the installation of the so-called "sailing day" plan for movements of package freight on the Buffalo, Rochester & Pittsburgh. Among other matters assigned to Mr. James in connection with his duties as special representative is the inauguration of a plan similar to the "sailing day" plan for the southwestern railroads under the jurisdiction of the committee in charge of operation in that section.

J. W. James

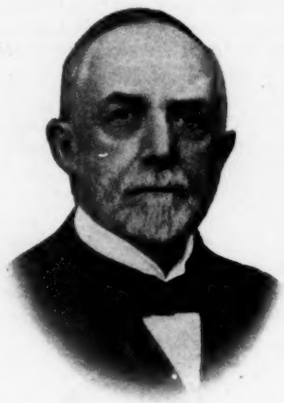
Obituary

A. S. Weinsheimer, secretary of the Pullman Company at Chicago, died on May 11, at the age of 72 years. Mr. Weinsheimer was born at Allentown, Pa., on May 12, 1846, and entered railway service in 1860 with the Lehigh Valley, with which he was consecutively telegraph operator, freight clerk and ticket agent. From 1864 until the termination of the Civil War he was connected with the U. S. Army Quartermaster's department at various points on the Baltimore & Ohio. In 1865 he again entered the service of the Lehigh Valley in the coal department. He severed his connections

with that company in 1871 to go with the Pullman Palace Car Company, at Chicago, and served it and its successor, the Pullman Company, until his death. He was cashier from September 1, 1875, to September 13, 1878, and from the latter date until his demise was secretary.

William Mahl

William Mahl, formerly vice-president and controller of the Southern Pacific Company, at New York, who retired on April 7, 1913, under the pension rules of the company, after 53 years' continuous railroad service, 31 of which were in the service of the Southern Pacific Company, died at Atlantic City, N. J., on May 13. Mr. Mahl was born in Carlsruhe, Baden, on December 19, 1843, and came to America with his parents in 1852. In 1860 he was entered as an apprentice in the shops of the Louisville & Nashville. In four years he became successively a machinist, a draftsman and chief clerk in the mechanical department. From 1864 to 1872 he was auditor and purchasing agent of the Louisville, Cincinnati & Lexington, now a part of the Louisville & Nashville. For a few years he served under Colonel Thomas A. Scott, on the Texas & Pacific, as auditor, purchasing agent and financial agent. Soon after the panic of 1873 he returned to the Louisville, Cincinnati & Lexington, and was appointed general superintendent. In February, 1882, Collis P. Huntington called him to New York, where he served successively as general agent, controller and assistant to the president of the Chesapeake & Ohio and the Southern Pacific, and the various collateral railways, steamship lines and other large interests of Mr. Huntington. After Mr. Huntington's death, E. H. Harriman continued and extended Mr. Mahl's functions so as to cover the entire Union Pacific and Southern Pacific systems. Mr. Mahl was vice-president and controller of both systems from October, 1909, until the Union Pacific and the Southern Pacific were separated under the order of the Supreme Court; and on February 6, 1913, he resigned from the Union Pacific.



W. Mahl

William Mahl belongs to the older generation of railroad men, of whom there are now only one or two still active in business life. He represented in a remarkable way the ideals of the great age of American railroad development; ideals of great achievement, of personal initiative, of arbitrary exercise of great powers, the ideals of a railroad system strictly under private ownership and private management.

When Mr. Mahl went to the Louisville & Nashville in 1864, Albert Fink was chief engineer, and shortly afterwards became general superintendent. Mahl's early training was, therefore, under one of the greatest of the older generation of railroad men, and one of the first students of scientific railroad operation.

In 1873, when William Mahl was auditor of the Texas & Pacific, Thomas A. Scott, later president of the Pennsylvania Railroad, was president; General Grenville M. Dodge, later chief engineer of the Union Pacific, and later chairman of the board of the Colorado & Southern, was chief engineer, and W. H. Newman, later president of the New York Central & Hudson River, and now chairman of the board, was general freight and passenger agent.

From 1882 on, Mr. Mahl was an assistant, with one title or another, to Collis P. Huntington. Whatever his title happened to be on the various roads which Mr. Huntington was interested in, his functions were actually those of watch-dog of the treasury. Collis P. Huntington was a man, generous to a degree, and the loyal co-operation and service of a man like Mr. Mahl, to whom waste was an abomination, was invaluable. The present generation of railroad men hardly realize how great a share C. P. Huntington had in the development of the railroads of the United States. In the early eighties he was president of the Chesapeake & Ohio, and was connected with the development of the roads now known as the Texas Lines of the Southern Pacific, and with numerous other railroad enterprises which were later linked up with the larger railroad systems of the country. Mr. Huntington's genius lay in the conception of the rapid development of great railroad projects. Mr. Mahl's contribution to the success of these projects was of very real importance. His was the analytical mind which permitted of the carrying out of the dreams of Mr. Huntington in an economical and scientific way.

Until the time of his death, Mr. Mahl was engaged in writing an autobiography of his long and remarkably interesting life. It is to be hoped that these memoirs were near enough completion so that they may be put in shape for publication by Mr. Mahl's heirs. Curiously enough, in a man whose life work dealt with a vast multiplicity of detailed figures, Mr. Mahl wrote not only clear, concise English, but could be, when interested in his subject, vividly interesting.

Mr. Mahl was not of the cost accounting school of the present day followers of the Interstate Commerce Commission's theories. In his work of preparing accounting figures and statistics for Mr. Huntington and his railroad officers, the fundamental principle was to so construct the accounts as to call the attention of the executive to a fluctuation in costs, and, where possible, to provide the figures for an explanation of this fluctuation. Starting in, as he did, as a machinist, Mr. Mahl was always particularly interested in the accounting of the mechanical department, and his contrast of his own desires and those of the Interstate Commerce Commission in maintenance of equipment expenses is illuminating as to his attitude toward railroad accounting in general. The Interstate Commerce Commission's chief desire is to allocate to each piece of work the cost of doing this piece of work. Mr. Mahl's fundamental principle was to make it apparent at a glance if a particular shop force were added to even to the extent of a single man.

Exacting from his subordinates the utmost precision, he, nevertheless, had a thorough contempt for bookkeeping as bookkeeping. No poet could have expressed more scorn than could Mr. Mahl in pronouncing the phrase "That is a mere matter of bookkeeping." As a matter of fact, Mr. Mahl was, in his use of figures in his annual reports, akin to a great artist in the use of colors, or a great author in the use of phrases and of the connotation of words to produce a particular effect. If one will study Mr. Mahl's reports of the Southern Pacific under Collis P. Huntington, this fact will be amply apparent. When a sale of bonds was impending, Mr. Mahl's annual report would be a picture of the assets of the Southern Pacific that was remarkably convincing. From the first set of tables to the last, touch after touch to this picture would be given until the facts which, under a man of less genius, would have been a compilation of figures and nothing more, stood out as vividly as a physical picture of the resources, the plowed in profits, and the equities behind the Southern Pacific stock and bonds.

Mr. Mahl's standard of honesty in accounting work, as in everything in his life, was absolutely uncompromising. It was 100 per cent.

When the late E. H. Harriman bought the Southern Pacific, he asked Mr. Mahl to become the controller of the Harriman lines and made him vice-president, promising authority similar to that which Mr. Mahl had had on the Southern Pacific under Collis P. Huntington. Probably this promise, made in perfect good faith, was impossible of accomplishment. Mr. Harriman himself had so intimate a grasp of detail that his own mind performed the functions which Mr. Mahl had supplied to Mr. Huntington's mind. But Mr. Harriman depended on Mr. Mahl as he did on few of his associates. When the Harriman lines were dissolved and the accounting problems, involved in the dissolution of the Southern Pacific and Union Pacific, had to be worked out with the restrictions on the one side of Mr. Harriman's dominating personality and inflexible purposes to carry out certain policies and, on the other, the restrictions of the decree of dissolution of the courts, Mr. Mahl felt that it was a task better fitted for younger men, and he retired from all active railroad work.